THE JOURNAL OF

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IN TWO PARTS—PART I

The London Medical Student's Point of View.....*David Sinclair*

The Physiograph—An Instrument for Teaching in Physiology.....*Hoff, Geddes, Spencer*

The Preceptorship System at U.V.M......*George A. Wolf, Jr.*

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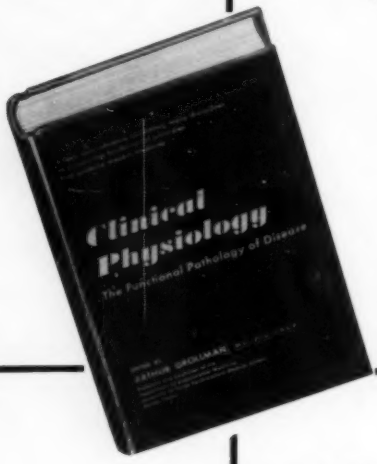

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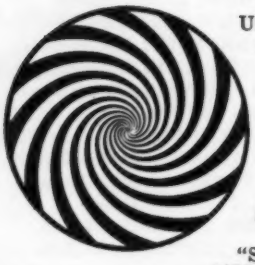

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With Our Authors

David C. Sinclair

The London Medical Student's Point of View. Dr. Sinclair was formerly in the department of human anatomy, University Museum, Oxford. Early this year he left to take part in the founding of the medical school at the University of Western Australia, in Perth. He heads the department of anatomy there.

Conwell, Gaventa, Lyons, Pye

Introduction of the Concept of Comprehensive Medicine.

Dr. Donald P. Conwell is director of the bureau of preventive medicine, Commonwealth of Kentucky, and assistant professor, department of community health, University of Louisville Medical School. He received his M.D. from Vanderbilt in 1943. He was formerly assistant professor of epidemiology at Tulane University School of Medicine.

Dr. William C. Gaventa is presently superintendent of the Baptist Mission Hospital in Nigeria. He was formerly an instructor in preventive medicine at Tulane University School of Medicine. He received his M.D. from Jefferson Medical College in 1945.

Betty C. Lyons is a medical social worker and administrative assistant to the Coordinator of Rehabilitation Teaching, and an associate in tropical medicine at Tulane University School of Medicine. She received her master's degree in social work at Tulane.

Claudia Pye is a medical social worker and associate in department of tropical medicine and public health at Tulane. She received her master's degree in social work at Tulane, also.

C. P. Martin

The Place of Anatomy in an Expanding Medical Curriculum. Dr. Martin, a native of Ireland, received his Sc.D. degree from Dublin University. Since 1936 he has been the Robert Reford Professor of Anatomy, McGill University, and chairman of the department.

Granger Westberg

Religious Aspects of Medical Teaching. Dr. Westberg is associate professor of religion and health, with a joint appointment on the Federated Theological Faculty and the Medical School Faculty of the University of Chicago. He is a graduate of Augustana College and Theological Seminary, and was formerly chaplain of the Augustana Hospital, Chicago. He is the author of *Nurse, Pastor and Patient.*

George A. Wolf Jr.

The Preceptorship System at U.V.M. Dr. Wolf is dean and professor of clinical medicine at the University of Vermont College of Medicine. He received his M.D. from Cornell in 1941. Prior to coming to Vermont in 1952, he directed the outpatient department at New York Hospital.

Hoff, Geddes, Spencer

The Physiograph—An Instrument in Teaching Physiology. Dr. Hoff is the Benjamin F. Hambleton professor and chairman of the department of physiology at Baylor. He received his M.D. from Harvard University, and prior to coming to Baylor in 1948, he was the Joseph Morley Drake professor and chairman of the department of physiology at McGill.

Dr. Leslie A. Geddes is assistant professor in the department of physiology at Baylor, and director of the laboratory of biophysics. He received his Master's Degree in Engineering in 1953 from McGill.

Dr. William A. Spencer has been associate professor of physiology at Baylor since 1951. He received his M.D. from Johns Hopkins in 1946. He is also medical director, Southwestern Poliomyelitis Respiratory Center, Jefferson Davis Hospital, Houston, Texas.

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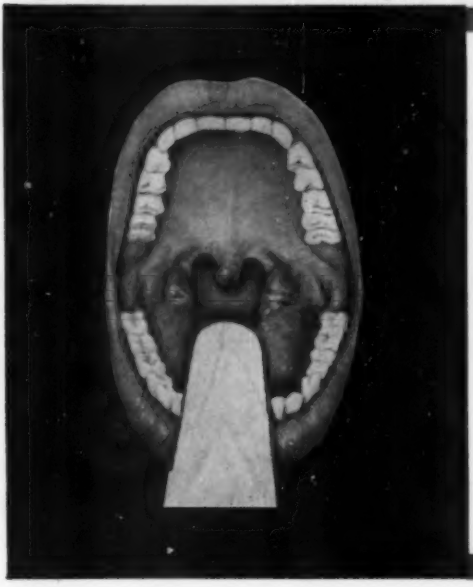

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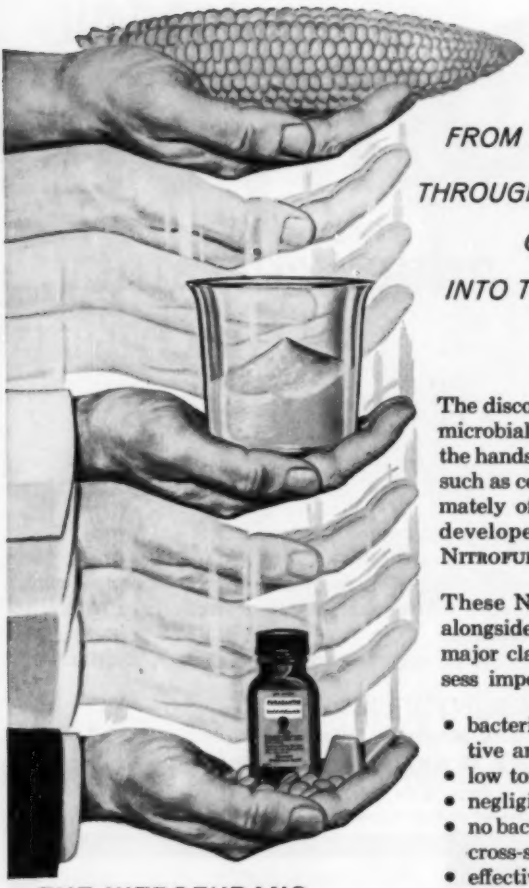
1. Carter, C. H., and Maley, M. C.: Antibiotics Annual 1956-1957, New York, Medical Encyclopedia, Inc., 1957, p. 51.



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International Congress on Dermatology—July 31-August 6; Stockholm, Sweden.

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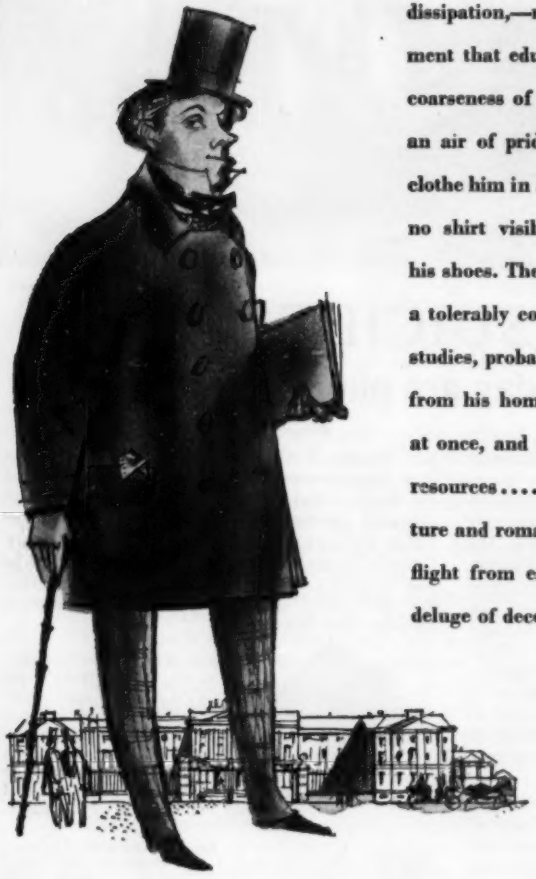

dissipation,—manners displaying at once the refinement that education must always produce, and the coarseness of what I fear I must call libertinism... an air of pride, likewise, and perhaps of poverty: clothe him in a pea-jacket, a rusty black stock, with no shirt visible, and trousers strapped down over his shoes. Then add a big stick, and you will possess a tolerably correct notion of a medical student. He studies, probably, at a school several hundred miles from his home. He is young and his own master; at once, and for the first time, thrown on his own resources.... Among this class the spirit of adventure and romance still lingers, ere she take her final flight from earth to heaven, before the advancing deluge of decency and matter of fact."

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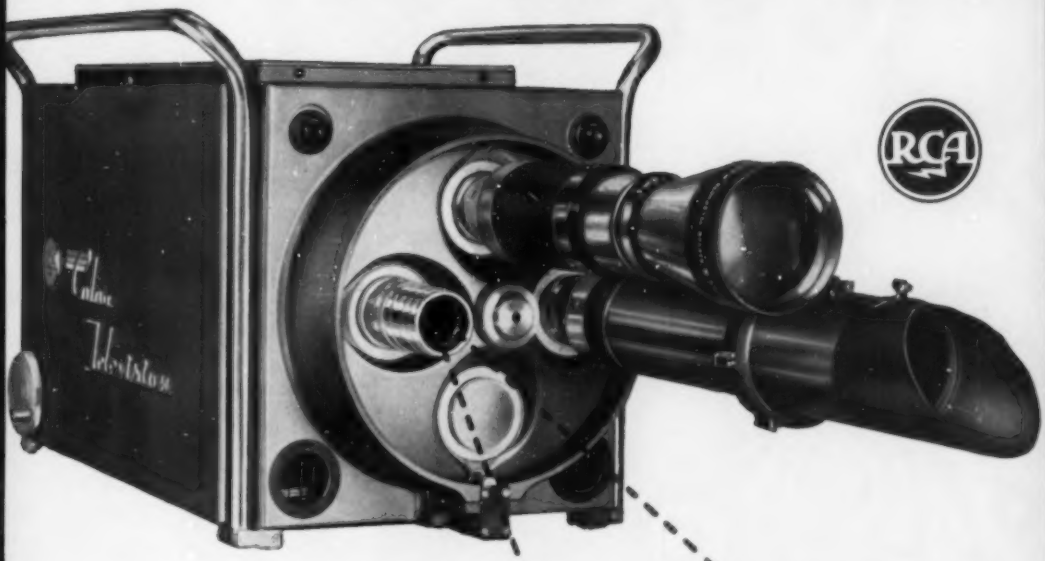

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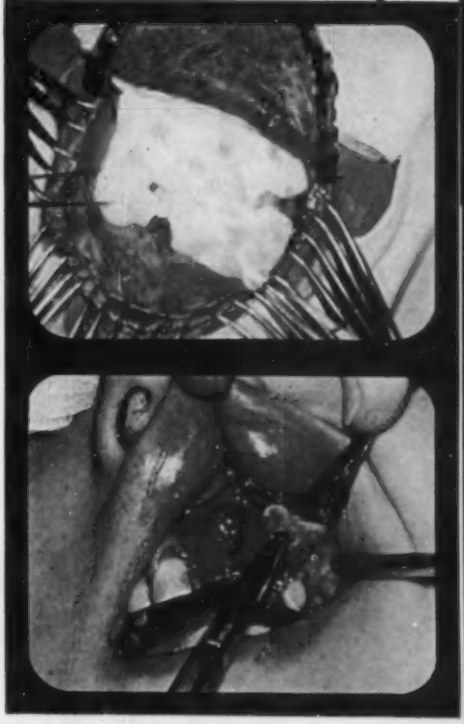

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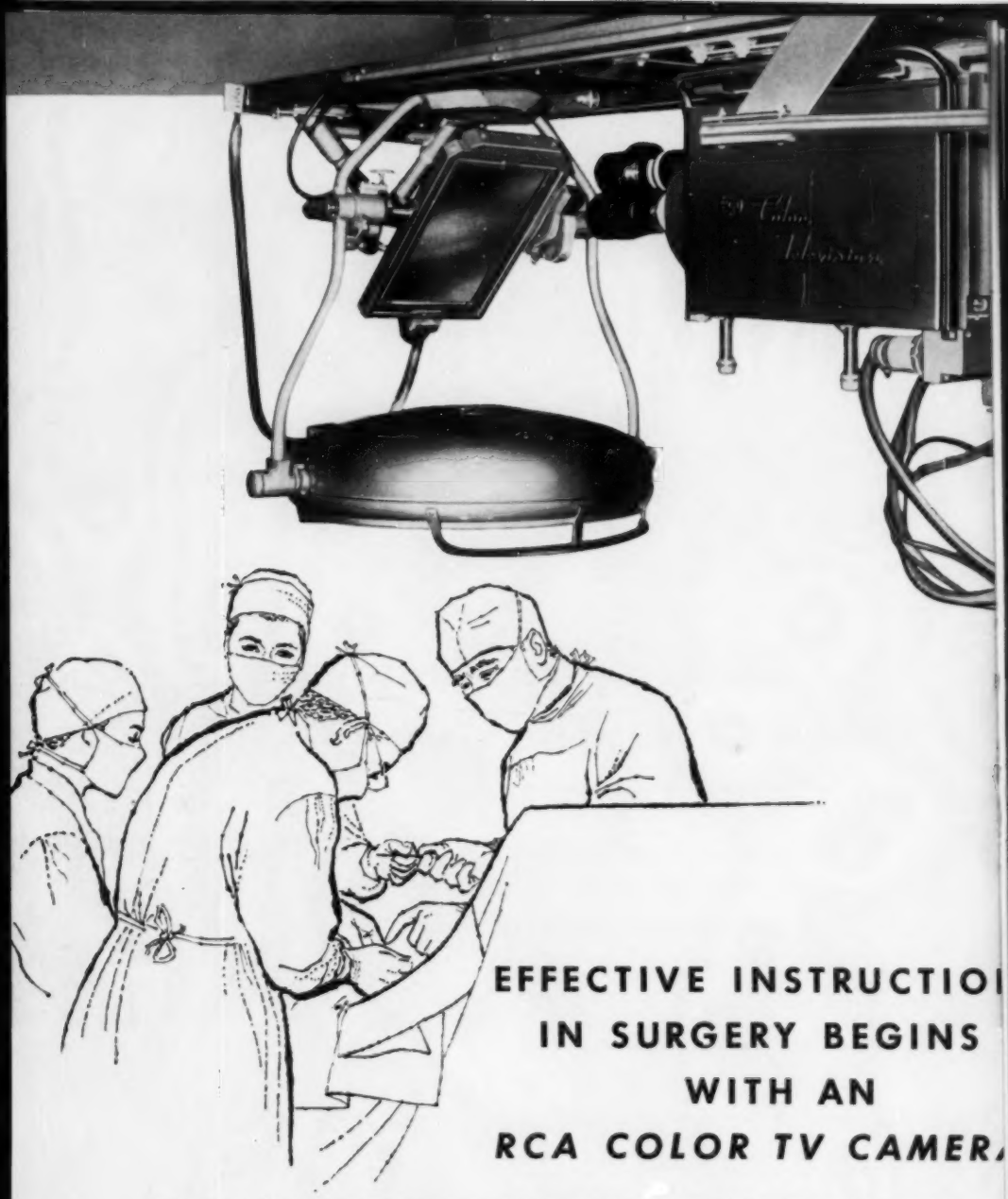

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1. Ross, S.: Antibiotics Annual 1955-1956. New York, Medical Encyclopedia, Inc., 1956, p. 600.

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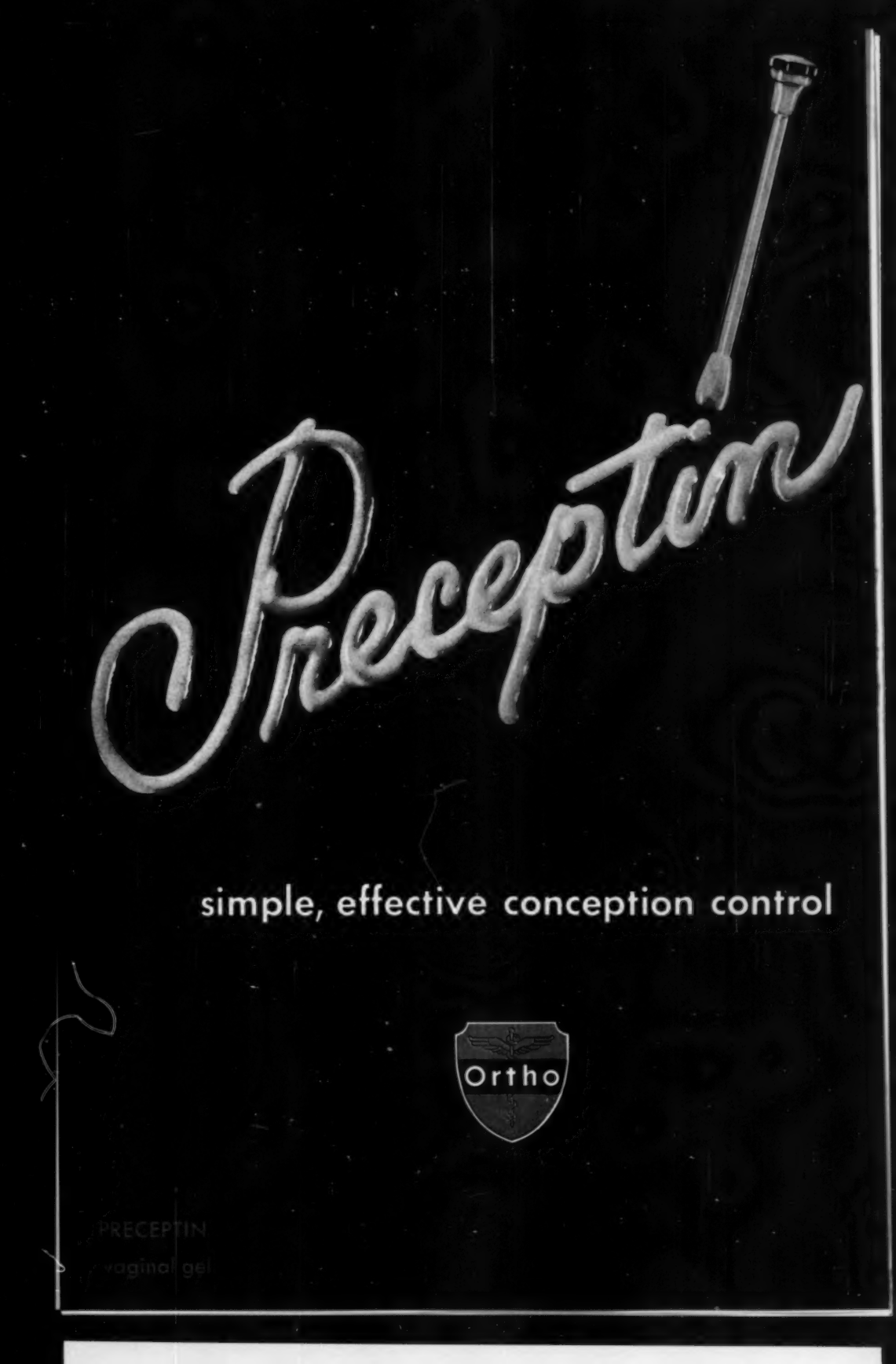
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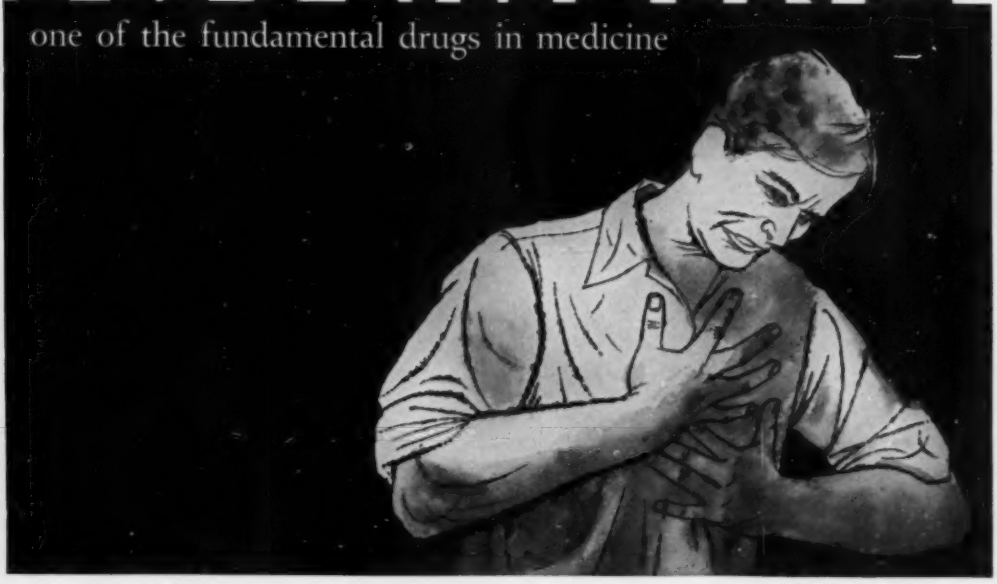

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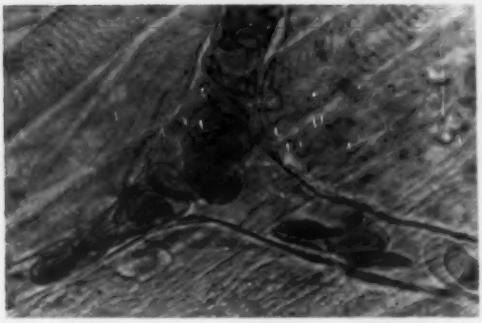

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*The American Foundation: Medical Research: A Midcentury Survey, Boston, Little, Brown and Company, 1955, vol. 1, p. XXXI.

**_Ibid._, p. 600.

The London Medical Student's Point of View

DAVID C. SINCLAIR

IT IS ALWAYS difficult for a teacher to find out what students think of teachers and teaching methods. He can certainly judge by the attendance at his classes whether he personally is satisfying what his own students consider to be their immediate needs, and he can also obtain a certain amount of information by means of questionnaires circulated to the class after they have safely escaped his clutches. (This idea has not yet established itself in Britain). But such methods yield results which apply only in a parochial manner: the few students concerned have little experience of other medical teachers and usually no experience at all of other methods of teaching the same subject. To obtain a broad view of student opinion it is necessary to synthesize the reactions of students from many different schools. In Britain it is seldom possible to do this, but an occasion arose in April last year when the London regional branch of the British Medical Students' Association held a symposium on medical education.

Students contribute to symposium

The meeting was designed to "provide an opportunity to outline the factors affecting medical education, to analyse so far as possible from student evidence its present state in relation to certain fundamental features, and to bring forward varying views on the aims that may in future be sought." Several papers were given by medical teachers[1], but it is no disparagement of the quality of the teachers' side of the program to say that the chief interest of the symposium lay in the contributions made by the students. There were 15 short papers from clinical students and two from newly qualified doctors: the participants were drawn from eight different medical schools in the London area. Several of them had begun their medical studies at Oxford or Cambridge and transferred to London for their clinical work: a few had some experience in medical teaching on the Continent or in America. The topics which they discussed included the effect of increasing factual knowledge, preparation for examinations, the clinical experience of students, the responsibilities of students towards patients, the relationships of students with the teaching staff, methods of learning as opposed to methods of teaching, and the differences between American and British medical education.

The question of admission requirements was raised only indirectly, but the student speakers endorsed the view of their teachers that they are inadequately grounded in general education before they begin their course. The Association considers that it should not be possible to

obtain exemption from the first professional (premedical) examination on the basis of work done at school.[2] The Senate of London University recently approved new admission regulations which will come into force after May 1, 1957. These no longer require passes in English language and mathematics or an approved science subject, the premise being, as stated by the Principal, that "responsibility for general education should rest with the schools and should be accepted by them without reservations."[3] Unfortunately there is no uniformity on this matter among British medical schools, and in consequence schools must continue to cater to pupils who have in mind other universities with more stringent scientific requirements. It is perhaps justifiable to correlate this fact with the complaint recently made by the Dean of the Westminster Medical School that a standard "bordering on illiteracy" had been shown in the vast majority of English papers submitted at its last entrance examination. That this complaint is not unfounded is familiar to most medical teachers in British schools.

At the symposium much was made of the ordeal of the second professional examination, which in London includes anatomy, physiology, biochemistry and pharmacology. This examination punctuates the transition from preclinical to clinical work, and does indeed involve a considerable effort; it is not possible to take the component subjects piecemeal, as can be done in the final examination. It was suggested that students were so exhausted by their preparations for the second professional examination that they were in no condition to appreciate the first stages of the clinical curriculum. About examinations in general it was felt that they should not be the only factor in determining the student's future; assessment by means of examinations was essentially assessment of factual knowledge only. Students were thought to have insufficient training in debating to acquit themselves well in oral examinations. One speaker pointed out how necessary it was to be physically fit for examinations, and how seldom this could be achieved by the common system of doing little work throughout the year and indulging in a last-minute high-pressure "panic." Two of the medical teachers present expressed the view that the "Conjoint" qualification should be abolished. This qualification is obtained from the Royal College of Physicians and the Royal College of Surgeons, and forms a kind of second string to the student's bow, since he can take the conjoint examinations without doing any work in addition to that for the university degree course.[2] It means, however, that by doing this he more or less doubles his examination effort, and he spends a great deal of additional money on fees in an attempt to secure his future.

One student speaker mentioned the distortion of clinical experience by clinical research and specialization which tends to occur particularly in London. The student's outlook is naturally determined largely by the type of clinical material he has to practice on, and if, as occasionally happens, he is attached to a ward completely full of partial thyroidectomies to acquire his surgical experience his horizon may come to be a rather limited one. I recollect a personal encounter with a London student before the war; he was sitting his final professional examination in a few days but he had never seen a patient with cardiac disease during the whole of his training. Other

people amplified this point at the symposium by saying that students should be encouraged to spend a considerable amount of time in the hospitals outside the centre of London, for in the outlying hospitals the clinical material was much more varied and directly useful. In some of the London schools this is in fact done, but in others the student's experience is more restricted. One student suggested that some of the trouble lay in the fact that the long summer vacation of the preclinical years was not carried through into the clinical period. In such a vacation, he argued, students could be encouraged to spend part of the time at a provincial hospital of their own choice. (One might also add that the provision of a long vacation would ensure that the student took a proper holiday and returned to his work refreshed).

Complaints

Complaints were made of overcrowding—the ward rounds tended, in one speaker's experience, to become lecture-demonstrations because of the size of the "firms." Others claimed that it was nowadays difficult to get adequate experience by working under supervision, but this situation appeared to vary considerably in different hospitals. There has recently been introduced into British medical education a "pre-registration year;" after a student qualifies as a doctor he is only provisionally registered as a medical practitioner, and must spend another year working under supervision before he can be fully registered and practice on his own. It was suggested that this regulation was essentially a vote of no-confidence in the present system of clinical education, and that the pre-registration year, which provided such valuable experience, made unnecessary much of the work which preceded it.

Several trenchant points were made about the teaching and the teachers. What the students desired above all else was that teachers should put their subjects in perspective by a proper distribution of emphasis. Too often they were exposed to a mere recital of facts without any indication that certain aspects of the problem could be regarded as "key" aspects or that certain conditions were clinically enormously more important than others. It was forcefully pointed out that junior teachers were too full of knowledge and too empty of wisdom; their intent was to keep a jump ahead of the students and so maintain their prestige. To this end they "swotted up" certain topics the night before and the next morning disgorged their vast store of learning mercilessly on the unfortunate class. One speaker suggested that registrars should have the duty of informing the class of the facts, and consultants should then arrange the facts in perspective. The historical approach to clinical teaching was also considered effective.

Teachers taught to teach

One of the main points made in relation to teachers was that they should be taught to teach—one student underlined the necessity by claiming that the majority of clinical lectures were "abysmally bad." Correspondingly, another considered that many students had little idea of how to set about learning, and suggested that some time should be spent on studying learning theory in the initial stages of the medical course. The fundamental point was also made that people in teaching posts should teach, and should not allow the claims of research or other duties to

interfere with their responsibilities to the students under their care. The gap of formality between teacher and student was discussed, and thought to be smaller than obtains in other European countries, but greater than the corresponding gap in America. It was conceded that this gap was not altogether the teacher's fault, and that some effort should be put into the relationship by the student. It was pointed out that any hierarchy is maintained by the principle of respect and the principle of authority. Students come from schools where eminence depends on authority, and in medical school the initial respect for the post held by the teacher should be succeeded by respect for the person who holds it. The tutorial system had the advantage that with one person at least the effort had to be made to get across the teacher-student barrier, and this led to an easier approach to other teachers.

The views expressed at this meeting are naturally those of the more articulate and experienced members of the student body, but they are not necessarily less valid because of that. As was natural, there was a certain amount of bellyaching—the toad beneath the harrow may be forgiven an occasional croak—but in general the student contributions were well thought out, well presented, and given with serious intent. The comments made cannot be taken to apply throughout Britain, because the medical schools of the University of London differ in many ways from those of other British universities. Nevertheless, the symposium resulted in a free local exchange of views between teachers and students, and it is to be hoped that other regions of the B.M.S.A. will follow suit.

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2. Sinclair, D. C.; "Medical Students and Medical Sciences," London, Oxford University Press, 1955
3. The Observer, London, November 20, 1955.

Puntos de vista de los estudiantes de Medicina de Londres

Siempre resulta difícil para un profesor averiguar qué es lo que los estudiantes piensan de él y de sus métodos de enseñanza. Para obtener un cuadro amplio de la opinión estudiantil, es necesario reunir las reacciones de los estudiantes de muy diferentes escuelas. En Inglaterra se presentó una rara ocasión para ello cuando, en Abril de 1956, la rama de Londres de la *British Medical Student's Association* celebró un *Symposium* sobre la Educación Médica. Este tenía el fin de "proveer una oportunidad para señalar los factores que afectan a la Educación Médica; analizar en la medida de lo posible, tomando por base las evidencias presentadas por los estudiantes, su presente estado en relación con ciertos rasgos fundamentales; y señaear puntos de vista varios sobre los objetivos a alcanzar en el futuro." Aunque se leyeron en al *Symposium* varios trabajos de educadores médicos, el interés principal del evento residía en las contribuciones hechas por los estudiantes. Estas consistían en 15 trabajos breves de estudiantes clínicos y 2 de estudiantes recién graduados, todos procedentes de 8 escuelas diferentes del área de Londres. Los temas discutidos variaban desde las condiciones de admisión a la Escuela y quejas sobre la forma de ciertos exámenes, hasta cuestiones fundamentales, como el problema de la deformación de la experiencia clínica por la investigación y la especialización, o el problema de los objetivos de la enseñanza universitaria. Los puntos de vista expresados en el *Symposium* eran, necesariamente, los de los estudiantes más articulados y con mayor experiencia, y los comentarios y críticas no pueden ser aplicados a toda la Educación Médica de Inglaterra. Pero el *Symposium* dió lugar a un muy útil y libre intercambio de ideas entre la Facultad y los estudiantes, y se espera que en otras regiones del país se seguirá este ejemplo. La Asociación está actualmente redactando, a instancias del *General Medical Council*, un informe sobre la educación médica pre-clínica, y buena parte de los trabajos leídos ante el *Symposium* han de servir seguramente de base al informe sobre la instrucción clínica que seguirá a éste.

The project described in this article was undertaken with the support of grant No. H-1757, National Heart Institute, National Institutes of Health. Further details may be obtained from the authors, Department of Physiology, Baylor University College of Medicine, Texas Medical Center, Houston 5, Texas.

The Physiograph— An Instrument in Teaching Physiology

HEBBEL E. HOFF, L. A. GEDDES & W. A. SPENCER

Introduction

THE NEGLECT into which the student laboratory of physiology has fallen is almost without counterpart in a century that has seen unprecedented advances in almost every other sphere of human activity and in the face of broad expansion of funds available for medical research. It would not be difficult to comprehend the competitive position of a business that had suffered so complete a lack of capital re-investment over so long a period. It should be no less apparent that medical and graduate students can no longer be taught with the instruments of a century ago. The opportunity and indeed the necessity thus present themselves of devising practical instrumentation to restore the laboratory of physiology to its proper place in medical education. This does not necessarily call for a totally new approach to physiological instrumentation but rather an extraction and modification of modern research techniques which will fit the more modest requirements of the undergraduate yet still retain the essence of accuracy and originality of experience.

The physiology laboratory as it exists today began when Carl Ludwig combined the smoked drum kymograph with the mercury manometer to produce the recording instrument which revolutionized physiological thinking and teaching. Even before Ludwig others had demonstrated how fruitfully the growing technology of physics could be applied to the biological sciences. The discoveries of Oersted and Faraday, for instance, had provided physiologists with practical stimulators which were almost immediately exploited by the brothers Weber in the elucidation of neuromuscular tetanus and in the discovery of vagal inhibition of the heart.

The significant contribution of the kymograph was that it made possible a wholly new approach to physiological studies through the graphic and permanent registration of physiological events as they vary with time. The excellence of the principle was quickly revealed by the broad spectrum of physiological quantities

which could be recorded by means of a series of ingeniously devised mechanical and electrical accessories. The kymograph, in the hands of Ludwig, Marey, Starling, Sherrington and scores of others, became the mediator of the great 19th century renaissance in physiology. It assisted at the birth of the related discipline of pharmacology in the laboratories of Cushny, Abel and Meltzer. Its principles were incorporated into more specialized instruments like the sphygmograph and the basal metabolism machine to inaugurate the extension of quantitative physiological studies into clinical medicine.

Thus, in its day, the kymograph brought physiological advances directly to the student in the fields of physiology, pharmacology and clinical medicine. In laboratories like those of Bowditch at Harvard and Sherrington at Oxford, the student could repeat the classical experiments of physiology and gain direct personal experience with the sources of physiological knowledge. In this respect the student laboratory and the research laboratory were in full and free communication and a wide horizon of physiological investigation opened before each student as he entered the laboratory. The stimulus that this opportunity presented is clearly manifested by the impressive numbers and quality of the students who were attracted to careers in physiology.

Even before the kymograph appeared, events began to transpire which were first to limit and then to eliminate the kymograph as the primary tool of physiological study. From the striking and classical experiments of Galvani, Matteucci, Du Bois Reymond and others, the electrical behavior of irritable tissues appeared on the scene as a new phenomenon. Measurement of these events was far beyond the ability of the kymograph with its mechanical-electrical accessories to sense and record, and a new recording science developed, based on the rheoscopic frog of Matteucci, the d'Arsonval galvanometer as used with the rheotome of Bernstein, and later, the Lippmann-Marey capillary electrometer adapted to photographic recording. The recording of electrical events with these instruments did not enter the student laboratory, nor did the string galvanometer of Einthoven, which supplanted them, ever become a tool for student use.

When the era of widespread electronic instrumentation began in the middle 20's, the opportunity again arose for the introduction of bioelectric phenomena to student teaching and experimentation. However, the student laboratory had already been dissociated from the field of electrophysiology for more than 35 years, and the tradition perforce had to be accepted that student teaching need not and could not deal directly with a main current of day-by-day advance in physiology. Thus, the student laboratory could no longer open its door to the new fields of investigation as it had in Bowditch's day with the kymograph. Students and teachers alike were not long in becoming aware of this situation. To both it meant a loss of the potential value of the laboratory as the place in which understanding of physiology is gained through direct experiential contact. To the student it meant the loss of the only place where nature could speak directly to him without the mediation of the instructor, and where he could join with Harvey and others who saw things that their instructors were unable to see. To the instructor it meant a divorcement of his own research program, almost wholly laboratory

centered, where each day's experiment conditions those of the days to follow, from his teaching program in the student laboratory.

Attempts have indeed been made to correct this situation, either by improving the accessories of the kymograph such as by electrical recording papers, or by supplementing the laboratory equipment with a few examples of each of the more widely used clinical and research instruments such as the electrocardiograph and oscilloscope.

To the best of our knowledge, however, no full scale attempt has yet been made at a fundamental solution to the problem of the complete re-creation of the student laboratory in physiology. Inquiry among many teachers, deans and administrators reveals a defeatist attitude variously expressed, which reflects almost certainly the frustrations each has met in attempting to solve this problem. Many, indeed, consider the problem insoluble and consider the adaptation of modern electronic instrumentation to be not only impractical for student use, but also unimportant, since time spent in the laboratory is largely unproductive and should be given over to what appear to be more successful teaching methods such as good instructional films. Others express the view that adequate instrumentation would be beyond the ability of the student to operate, requiring graduate engineers or physicists as students, and that the apparatus would be excessively costly, prone to failures and would require a staff of physicists to maintain. Another objection often raised is that an adequate instrumentation program is a form of push-button medicine, and is not in the proper tradition of medical education. Some even felt that the trials and tribulations of attempting to operate the old system were good discipline and therefore valuable exercise even if few or no results were obtained, since in fact one is traditionally supposed to learn more from experiments that do not work than from those that do. Pursuing this logic, one should arrange experiments so that failure is guaranteed.

As a matter of fact it is only within very recent years that an attack on the problem of adequate instrumentation for the student laboratory could have been made. Despite the great advances in technological instrumentation in the fields of research and clinical investigation, the instruments available have been almost prohibitively expensive and poorly adapted for student use. Most particularly, each instrument has been made for a specialized purpose with its own recording system, and is usually incompatible with that of other recorders, so that it has been difficult and expensive to assemble the kind of coordinated system achieved by the more primitive kymograph as one of its best attributes.

Any instrumentation program designed to replace the kymograph must not only be able to duplicate the facilities provided by the kymograph recording system but it must in addition possess its own unique properties akin to those which earned the kymograph its central position in the physiological laboratory. Furthermore the system must reflect the main current of physiological advances and be able to record, display and demonstrate an extremely wide range of physiological phenomena. It must be designed to incorporate recognized principles of modern instrumentation utilizing to the fullest degree the resources of present-day engineering and technology. The program must inherently constitute an integrated system of flexible and in-

terchangeable units capable of accepting new components as they are developed. Most importantly, simplicity and obviousness of operation must be a paramount consideration if it is to be of genuine usefulness in the hands of the students. Essentially this demands readiness, convenience and reliability in the graphic recording or visualization of the body of physiological knowledge.

Translated into more specific terms, this means that the instrumentation program must primarily provide adequate coverage of the heart and circulation, muscle and nerve, respiration and the nervous system. Studies of certain aspects of renal physiology, endocrinology, metabolism, digestion, etc., should be possible by an extension of the same techniques and principles underlying the reproduction of the more accessible phenomena such as blood pressure and respiration

A close examination of the principles of measurement embodied in the kymographic system is a logical starting point. In the broadest sense, the recording of a physiological event with the kymograph can be called single-channel data recording. A system capable of performing such a task has an input, an output and an intermediate processing system. The output is the recording device and the processing system is the interconnecting linkage. When recording muscular pull, for example, the input connection is the attachment to the muscle or tendon, the output is the recording stylus reproducing muscular pull by scratching soot from the kymograph paper, the intermediate processing system is the linkage of pulleys, strings and weights which load and connect the muscle to the writing lever.

When the system is transformed from mechanics to electronics, a most universal and practical system evolves. Expressing the principles in the phraseology of electronic engineering, a single data recording channel consists of a *transducer*, a *processor* and a *reproducer*.

The *transducer* or pick-up is sensitive to and discriminates the characteristic property to be studied and converts changes in this property into an equivalent electrical signal. In a very real way the transducer is akin to a sense organ in its selective sensitivity to changes of one particular kind of energy and in its ability to transform this energy into the electrical code of the central processing system. The transducer differs from the sense organ in that it must interpose no alteration of its own in the conversion of changes in the property as described by duration, frequency and intensity. Unlike the sense organ it must *not* adapt or accommodate. The *processor* handles information submitted by the transducer in an appropriate way for ultimate reproduction. Processing techniques such as addition and subtraction as in a bookkeeping machine, multiplication or electronic mathematical computation, are typical operations of the processing device. Processors may be called upon to introduce time lags or scramble information as in communication systems, or integrate widely disparate data as in artillery fire-control systems. In physiology, the appropriate processing is far simpler, for in most instances the main problem is one of multiplication, or more simply stated, amplification. Care must be taken so that no distortion will be introduced between the input and output throughout the whole course of reproduction, (i.e., linear characteristics are to be achieved). Thus, the problem of the processor in physio-

logical studies is largely the provision of amplification with direct coupled characteristics in order to reproduce faithfully slowly changing events. It is of course recognized that the processor in physiology may be called upon to perform other functions. It may filter undesirable frequencies as in phonocardiography, it may integrate air-flow velocity with time to give volume, or it may perform a vector analysis of wave forms in the electrocardiogram. The *reproducer* displays the processed electrical signal in a simplified visual or audible representation. This representation must be faithful to the signal received in terms of intensity and rate of change. The most useful visual and audible reproducers in physiological representation include the recording galvanometer, oscilloscope and loudspeaker. Very frequently the information can be displayed directly in the form of a graphic record produced by direct inking pen.

Some of the more obvious advantages of the employment of this technique of instrumentation reside in the following: (a) Minimal or absent modification of the event observed, i.e., small energy extraction by highly sensitive transducers. (b) Control of sensitivity and selectivity, i.e., discrimination. (c) Wide range of response time for slow and fast events. (d) Simplicity and accuracy of reproduction of single, multiple, similar or dissimilar, continuous or transient events. (e) Conversion of the property studied to an electrical signal permitting remote location of processing and reproducing equipment. (f) Unlimited recording time with the ability to study any event along different time scales.

In contrast with the above, the principles embodied in the kymograph required that: (a) The inherently small signal reproduced had to arise from the event detected. (b) The phenomenon studied was modified by the mechanics of the processing and reproducing systems. (c) The character of the reproduction was largely dependent upon the mechanical properties of the connecting linkage. (d) The field of application was largely restricted to mechanical events. (e) The subject had to be placed in the close and often inconvenient proximity to the recorder. (f) The length of recording time was limited by the length of a loop of smoked paper.

These characteristics not only eliminated the whole field of bioelectricity from kymographic study but made the recording of a large group of low-energy phenomena a trial of ingenuity, delicacy, and patience that restricted these fields to the expert and to occasional rather than routine success. Most of all, variability and the limited energy available made it necessary to employ recorders of different sensitivities and inertias and hence of unequal response times, making it difficult to correlate in time a number of events registered by different recorders. This disability of course is fully eliminated when amplification is available to equalize the output despite the wide differences in energy input from physiological processes which may range from the 50 kilogram pull of a dog quadriceps in full tetanus to the minuscule energy of a single spike potential in an axon. Beyond these limits is the spectrum of events that are detectable without the necessity of drawing energy from the phenomenon studied, such as oximetry, blood flow velocity, etc. These considerations virtually dictate the adoption of an integrated system based on the electronic transduction of the physiological event to an electrical signal. The instrumentation

program described below, incorporating these principles, has resulted in the construction of 20 physiological recorders called *physiographs*. They have been in almost constant service for over two years, each serving a group of four students.

The physiograph

The physiograph is a recording instrument which accepts a variety of inputs from transducers, processes these signals and reproduces simultaneously three physiological events on a time-calibrated record. The recording speed can be varied to suit the data with suitable calibration present at all times. In addition, those tissues that respond to electrical stimuli can be activated appropriately by use of an integrated stimulator which signals its operation on the record. Cause and effect and time relationships are thus recorded, calibrated and presented simultaneously on a single graphic record.

The basic physiograph is shown in Figure 1. Conspicious in the foreground is the recording chart which is the standard 8½ x 11″ folded paper similar to that used so extensively by electroencephalographers. Above it can be seen four light-colored panels. The first three are the channel amplifiers and the fourth is the stimulator. On the upper right hand corner of the top panel can be seen the paper control unit. Its function is to control the chart-drive motor and energize the timer and signal pens.

Below the paper control unit are the recording styli. Reading from top to bottom, the first three pens are connected to channels I, II and III. The fourth pen performs double duty by calibrating the record with time marks and signalling any other important event such as electrical stimulation or drug injection. To the right of the recording styli can be seen the plastic squeeze-bottle ink wells which can be raised or lowered to provide an adequate flow of ink at all recording speeds.

Housed in this single cabinet are three self-contained channel amplifiers, their recorders, a stimulator

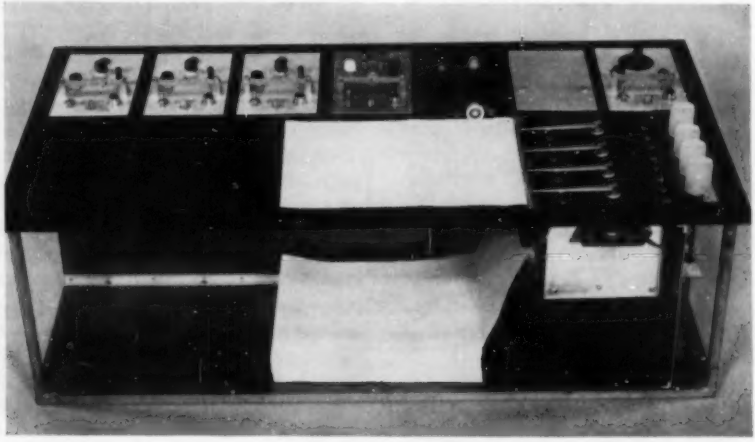


Figure 1—The physiograph.

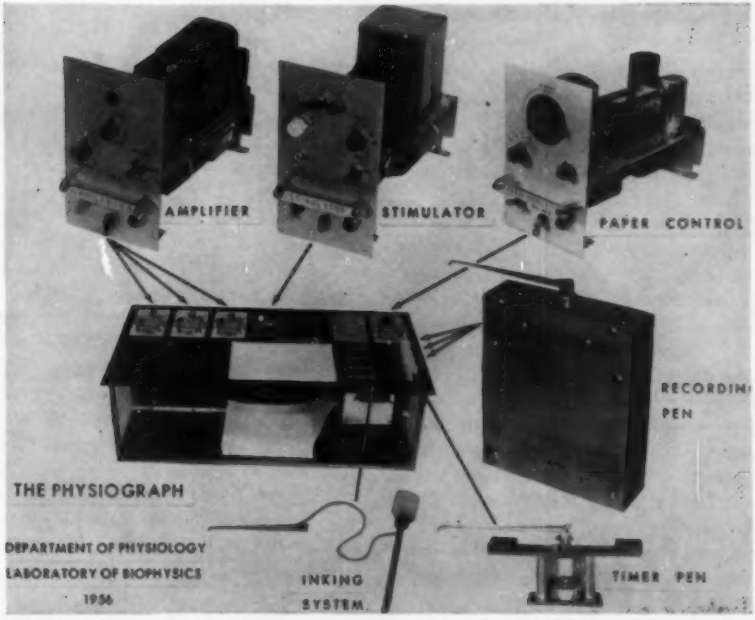


Figure 2—An exploded view of the physiograph showing its basic components.

and a spare opening for any additional experimental unit. In operation, the pick-up, located near the subject, is connected by cable, and recordings of a wide spectrum of physiological events can be made by the student with extreme ease.

The structural skeleton of the physiograph is an open frame chassis, having a black anodized aluminum top panel in which openings for six physiograph units have been provided. The framework is constructed of square steel tubing brazed and protected against rust by heavy cadmium plate. Installed in this cabinet is a universal-connector wiring system which is so extensively standardized that misinstallation of any unit into a wrong opening will permit the particular unit to operate normally or will completely inactivate it. Although the original motivation for inclusion of this system was to provide for service by total interchange of a defective unit, experience has shown that failures have been rare indeed and that this feature now finds its principal use in providing flexibility in recording by selection of appropriate units. An even more desirable characteristic is that an experimental set-up can be easily changed during an experiment as the recordings and events dictate.

There are no other components integral to the basic cabinet. The pens, their styli, the ink wells, and the paper drive motor are easily removed. Each physiograph unit carries a chrome plated handle which identifies its function. Any of the units (3 amplifiers, stimulator and paper control unit) is removable by turning a small lever on its panel one half turn. This unlocks and raises the particular unit approximately one quarter inch, and automatically disconnects it from the power and other circuits. The unit can then be removed by using the handle to slide it upward, free of the

cabinet, like pulling out a drawer. All of the units that fit into the cabinet will function in the cabinet. Figure 2 is an exploded view of the physiograph with its essential components.

The present physiographs provide a recording paper speed extending from faster than EKG or EEG speed (25 and 30 mm. per second) to one sheet (11″) in approximately two hours. Two year's experience has shown that this range is adequate for critical examination of a wide range of physiological variables. It permits the taking of standard electroencephalograms with the physiograph and is adequate to record slow peristaltic waves or the very gradual changes in blood pressure due to hormonal substances or ganglionic blocking agents.

Time and Signal Marker: To register time marks, a timed source of energy is provided to activate a recording stylus. The particular spectrum of time signals used with physiological recording systems extends from second to minute intervals. In this range, experience has shown that the most useful time calibration marks are 1, 5, 30 and 60 seconds. Accordingly, a simple timing unit generating these signals with sufficient energy to operate a recording stylus was incorporated into the paper control unit.

To use a single pen to inscribe time lines is of value but is a waste of resources in view of the other important events requiring signalling. It seemed natural and practical to make the timer pen perform both of these functions by deflection above and below a mid-position. For almost 100 years, timing marks have appeared at the bottom of records as downward "pips." This convention was acknowledged accordingly, and it was decided to signal any other event by an upward deflection of the same pen.

Figure 3 illustrates how the principle of data recording has been applied to a single channel of the physiograph. At the left is a group of transducers or pick-ups for various physiological phenomena. In the center is the basic amplifier and on the right appears the direct recorder.

The transducers were constructed for high conversion efficiency in keeping with Rein's dictum, "Minimum electronics; maximum efficiency in the transducers." A useful principle which is characterized by a high conversion ratio and lending itself directly to the measurement of many physiological quantities depends on photoelectricity. By causing a shade to alter the light falling on a phototube, a substantial electrical signal can be obtained for a relatively small mechanical displacement. This principle has been applied in the construction of a variety of myographs, the pneumograph and the blood pressure transducer. The design of course incorporates linearity of transduction so that the electrical signal duplicates the event itself.

Physiological events occurring naturally as electrical signals require no transduction. They do however require amplification to increase their output to match that of the other transducers. A general-purpose preamplifier has been provided for the bioelectric signals arising in heart, brain, nerve and muscle. The preamplifier can also accept signals from low efficiency transducers such as heart sound microphones, etc.

The processor, a direct coupled balanced power amplifier, enlarges the electrical signals from the transducers and forwards them to the recording pen for graphic reproduction. It also provides appropriate

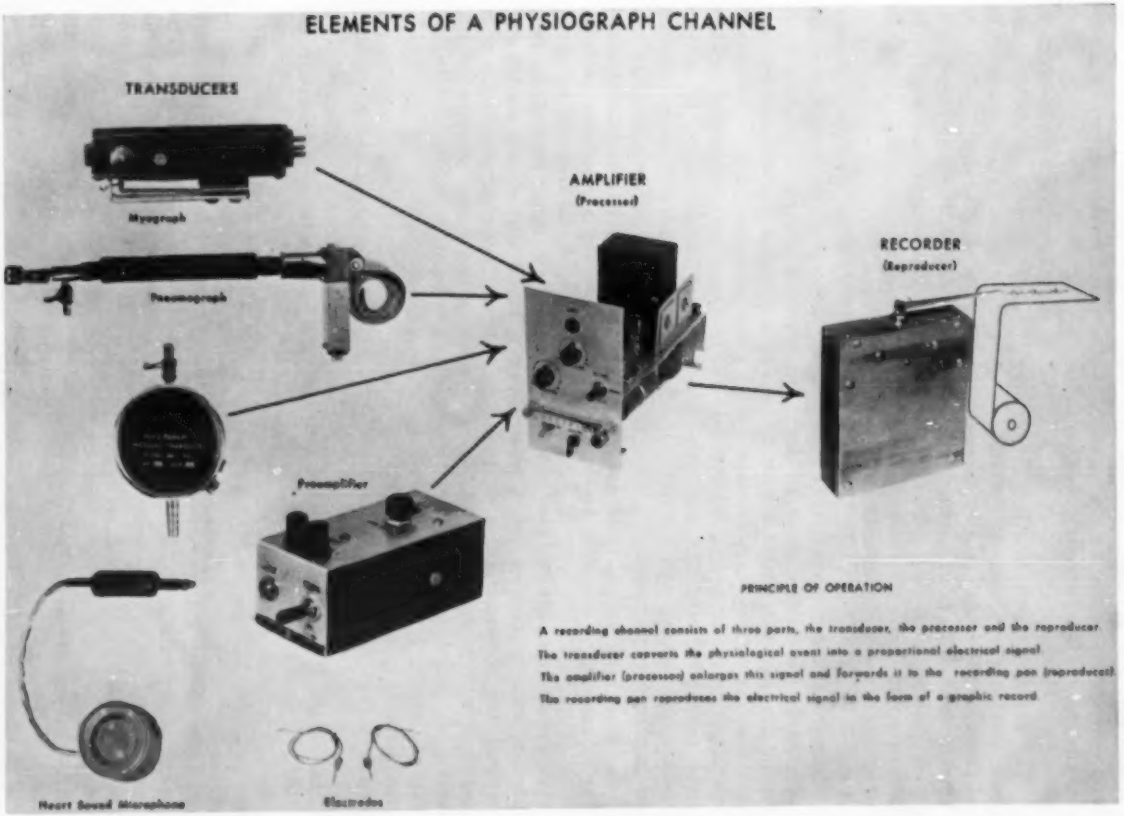

ELEMENTS OF A PHYSIOGRAPH CHANNEL
TRANSDUCERS
Myograph
Pneumograph
Preamplifier
Heart Sound Microphone
Electrodes
AMPLIFIER
(Processor)
RECORDER
(Reproducer)
PRINCIPLE OF OPERATION
A recording channel consists of three parts, the transducer, the processor and the reproducer.
The transducer converts the physiological event into a proportional electrical signal.
The amplifier (processor) enlarges this signal and forwards it to the recording pen (reproducer).
The recording pen reproduces the electrical signal in the form of a graphic record.

FIGURE 3

power for the various transducers and preamplifiers, a single cable making all of the necessary connections.

The recording pen is a large robust d'Arsonval movement capable of producing a maximum pen deflection of four inches. In performance it is closely akin to electroencephalographic and electrocardiographic recorders and combines certain features of both.

Numerous other transducers and accessories have been made or are under development. Devices such as defibrillators, heart sound apparatus, cycling respirators, and oscilloscopes have been completed. All are compatible electrically, and fit into the basic physiograph console.

Typical records

To demonstrate the features of the physiograph, a number of typical records are shown. Figures 4 to 9 are records from various student experiments which serve to illustrate the philosophy of the program and the features of the instrument. In addition they show the manner in which records can be analyzed.

In Figure 4, the effect of load on turtle cardiac muscle is clearly demonstrated. After each beat, the resting load on the ventricle was increased. The response to increased diastolic tension manifests itself by an increase in the force of contraction. The graphic representation of this phenomenon, known to all as Starling's Law of the Heart, appears on the upper right hand corner of the record.

The counterpart of Starling's Law in skeletal muscle is shown in Figure 5. Here, between single twitches, the resting load was increased by increments. The parameters of stimulation and load are noted on the record, and the graph summarizes the effect of force of contraction versus resting tension.

The usual rhythmic contractions of the smooth muscle of the gut are shown in Figures 6a and b. Figure 6a shows the well-known effect of acetylcholine on the tone and amplitude of contractions and Figure 6b illustrates the relaxing effect of epinephrine.

The difference between systemic blood pressure and intraventricular pressure is shown in Figure 7. A plastic catheter was inserted through the aortic valve during systole and the first part of the record shows left ventricular pressure. After a few beats, the catheter was withdrawn into the aorta (between arrows) and the systemic aortic pressure was recorded. During systole the catheter was re-introduced into the left ventricle and the latter part of the record is again that of left ventricular pressure. The electrocardiogram is shown on the second channel for reference purposes.

Practically the whole syndrome of auricular fibrillation is depicted in Figure 8. Channel one is a direct auricular electrogram; channel two is the conventional electrocardiogram from Lead II and channel three shows the blood pressure in the right carotid artery. The typical fibrillating waves of the auricles are emphasized in the first channel. The P waves have disappeared from the EKG and are replaced by rapid fibrillatory waves in channel II, which shows also the complete irregularity of rate and amplitude of R. A rapid and totally irregular pulse is shown by the blood pressure record, and the discrepancy between EKG and pulse rates indicates the existence of a pulse deficit.

The influence of left vagal stimu-

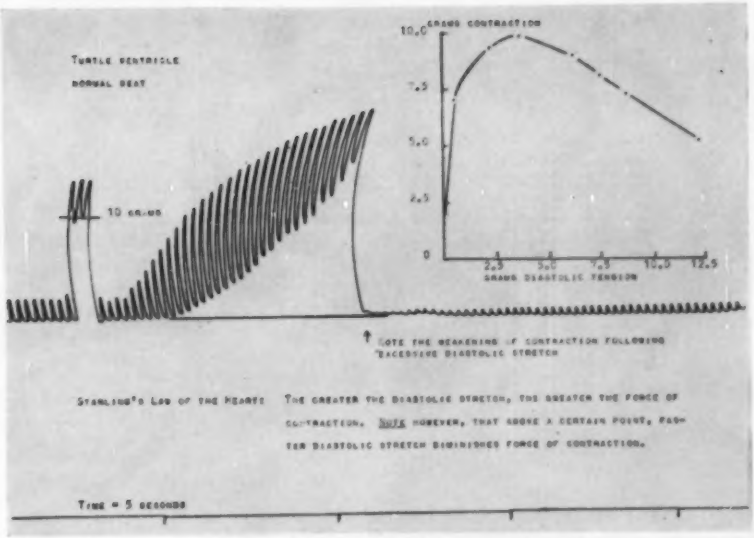


Figure 4—Starling's law of the heart. Legends and the graph, etc. were typed and drawn on the original record sheet.

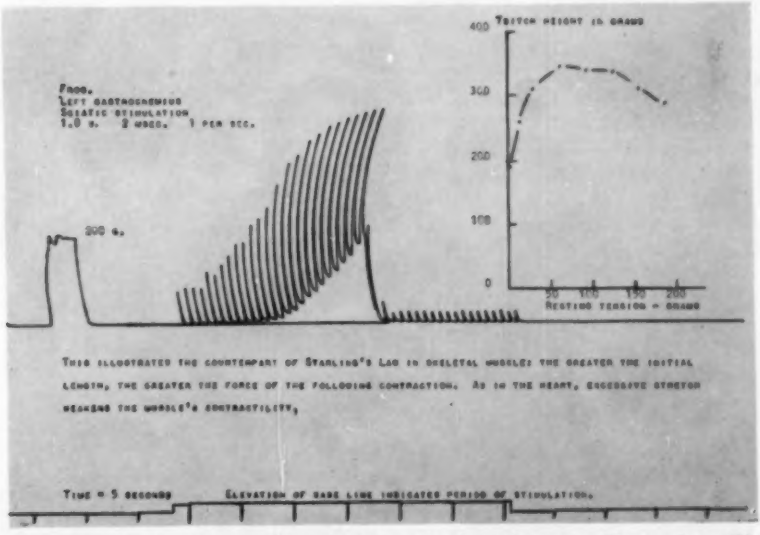
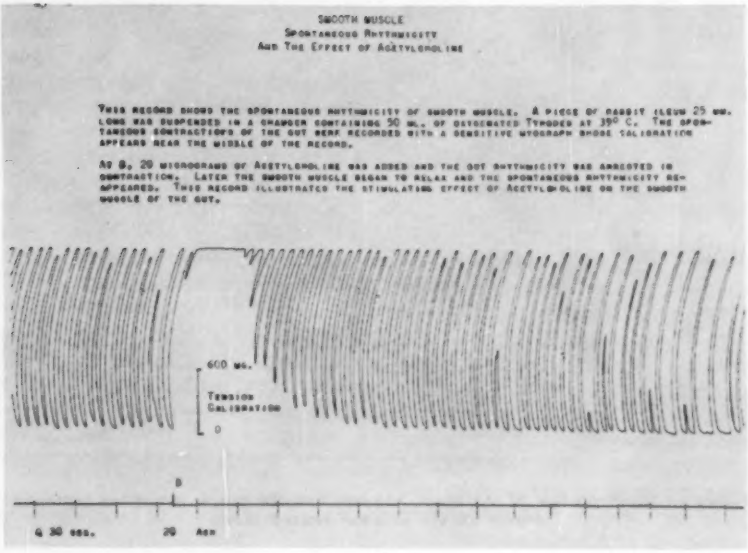

FROG.
LEFT GASTROCNEMIUS
SEMATIC STIMULATION
1.0 v. 2 MSEC. 1 PER SEC.
200 G.
TETANIC HEIGHT IN GRAMS
400
300
200
100
0
50
100
150
200
RESTING TENSION = GRAMS
THIS ILLUSTRATES THE COUNTERPART OF STARLING'S LAW IN SKELETAL MUSCLE: THE GREATER THE INITIAL LENGTH, THE GREATER THE FORCE OF THE FOLLOWING CONTRACTION. AS IN THE HEART, EXCESSIVE STRETCH WEAKENS THE MUSCLE'S CONTRACTILITY.
TIME = 5 SECONDS
ELEVATION OF BASE LINE INDICATES PERIOD OF STIMULATION.

Figure 5—The counterpart of Starling's Law in skeletal muscle. Time and amplification have been changed appropriately to present the data in the same form as Figure 4.

6a


SMOOTH MUSCLE
SPONTANEOUS RHYTHMICITY
AND THE EFFECT OF ACETYLCHOLINE
THIS RECORD SHOWS THE SPONTANEOUS RHYTHMICITY OF SMOOTH MUSCLE. A PIECE OF RABBIT ILEUM 25 MM. LONG WAS SUSPENDED IN A CHAMBER CONTAINING 50 ML. OF OXYGENATED TYRODES AT 39° C. THE SPONTANEOUS CONTRACTIONS OF THE GUT WERE RECORDED WITH A SENSITIVE MYOGRAPH WHOSE CALIBRATION APPEARS NEAR THE MIDDLE OF THE RECORD.
AT B, 20 MICROGRAMS OF ACETYLCHOLINE WAS ADDED AND THE GUT RHYTHMICITY WAS ARRESTED IN CONTRACTION. LATER THE SMOOTH MUSCLE BEGAN TO RELAX AND THE SPONTANEOUS RHYTHMICITY REAPPEARED. THIS RECORD ILLUSTRATES THE STIMULATING EFFECT OF ACETYLCHOLINE ON THE SMOOTH MUSCLE OF THE GUT.
600 MG.
TENSION
CALIBRATION
0
B
4 30 SEC.
20 MCG

6b

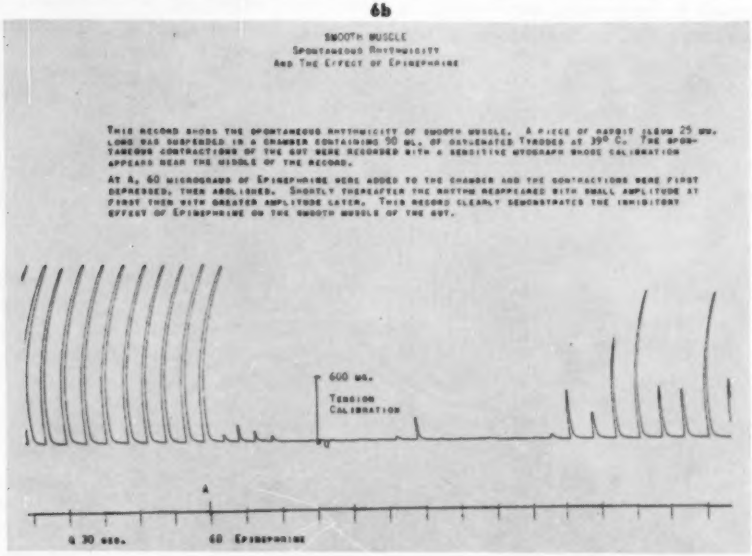

SMOOTH MUSCLE
SPONTANEOUS RHYTHMICITY
AND THE EFFECT OF EPINEPHRINE
THIS RECORD SHOWS THE SPONTANEOUS RHYTHMICITY OF SMOOTH MUSCLE. A PIECE OF RABBIT ILEUM 25 MM. LONG WAS SUSPENDED IN A CHAMBER CONTAINING 50 ML. OF OXYGENATED TYRODES AT 39° C. THE SPONTANEOUS CONTRACTIONS OF THE GUT WERE RECORDED WITH A SENSITIVE MYOGRAPH WHOSE CALIBRATION APPEARS NEAR THE MIDDLE OF THE RECORD.
AT A, 60 MICROGRAMS OF EPINEPHRINE WERE ADDED TO THE CHAMBER AND THE CONTRACTIONS WERE FIRST DEPRESSED, THEN ABOLISHED. SHORTLY THEREAFTER THE RHYTHM REAPPEARED WITH SMALL AMPLITUDE AT FIRST THEN WITH GREATER AMPLITUDE LATER. THIS RECORD CLEARLY DEMONSTRATED THE INHIBITORY EFFECT OF EPINEPHRINE ON THE SMOOTH MUSCLE OF THE GUT.
600 MG.
TENSION
CALIBRATION
0
A
4 30 SEC.
60 EPINEPHRINE

Figure 6—The contraction of smooth muscle. Note again the change in time and amplification. Three different myographs were employed in the three experiments.

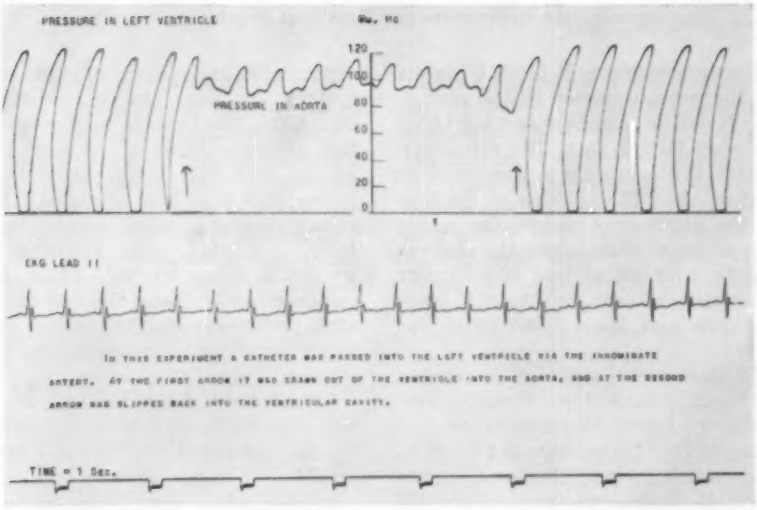

PRESSURE IN LEFT VENTRICLE
Mm. Hg
120
100
80
60
40
20
0
PRESSURE IN AORTA
EKG LEAD II
IN THIS EXPERIMENT A CATHETER WAS PASSED INTO THE LEFT VENTRICLE VIA THE INNOMINATE
ARTERY. AT THE FIRST ARROW IT WAS DRAWN OUT OF THE VENTRICLE INTO THE AORTA, AND AT THE SECOND
ARROW WAS SLIPPED BACK INTO THE VENTRICULAR CAVITY.
TIME = 1 Sec.

Figure 7—Intraventricular and intra-aortic pressure in the dog.

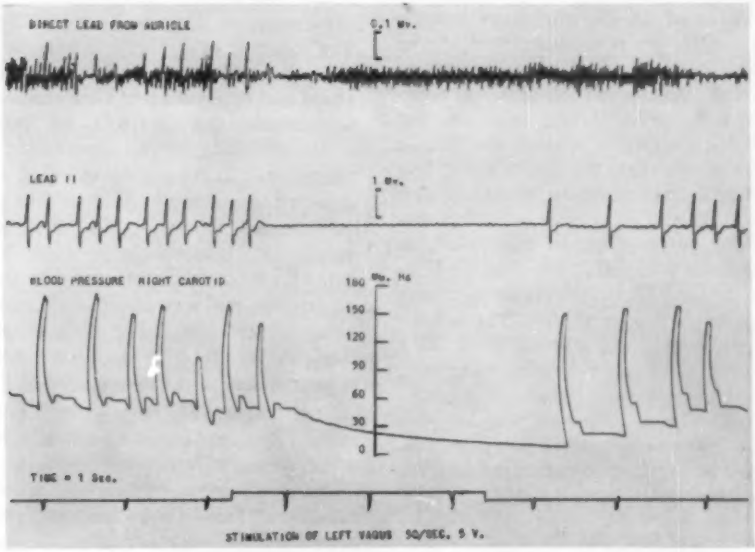


Figure 8—Auricular fibrillation in the dog, produced by application of acetyl-B-methyl choline chloride to the surface of the right atrium.

lation in creating A-V block is shown by the central portion of the record. The R waves disappear and the blood pressure falls to zero. The refractory period of the auricle is shortened as evidenced by the increase in the rate of the fibrillatory waves. On cessation of vagal stimulation, the characteristic over-all pattern of auricular fibrillation returns, but the first beats are slow and there is no pulse deficit.

Ventricular fibrillation is shown in Figures 9a and 9b. Channel one displays carotid blood pressure and channel two is the standard Lead II electrocardiogram. When ventricular fibrillation was precipitated by direct stimulation of the ventricles in Figure 9a, at the time indicated by the signal marker, blood pressure fell to near zero and the normal electrocardiogram was replaced by fibrillating waves. Manual compression, or "massage," of the heart was instituted and the circulation was maintained. A dicrotic wave can be seen after each compression of the heart. In Figure 9b, immediately following the period of manual compression, defibrillation was carried out by passing a strong alternating current through the heart for a few seconds. Following the period of defibrillation, a quiescent period is observed during which the heart is filled with blood. With this load on the myocardium, the first spontaneous beat is very strong. The subsequent beats are smaller and with the return of normal cardiac rhythm, blood pressure is ultimately reestablished. The EKG accompanying the first few beats cannot be seen because of blocking of the preamplifier by the defibrillating current.

Summary of First Two Years' Operation

There can be no question of the enthusiastic reception of the new system by the student. Without doubt this has been in part a reflection of the attitude of the staff, and of the fact that senior as well as junior staff members attended laboratory sessions more often, more fully, and paid more attention to what was going on. Two years' experience shows that (a) some of the early criticisms of the system can be answered with confidence, (b) the laboratory has attained a new significance for the student and (c) it will demand more from the instructor but will repay him with a greater satisfaction in his work.

The readiness with which students have gained mastery of the instrument has been surprising. The first day's experiment using a single channel was adequate for most students to familiarize themselves with the equipment and its basic principles. Thereafter channels were added one by one, and three-channel arrangements presented no problems. The location of controls in standardized positions was quickly understood and often students are observed to operate the controls by touch while watching either the record or the animal. It was apparent that this generation of students has become accustomed to radio and television, automatic transmissions, etc., and can operate instrumental controls when the end result of such operation is understandable even though the precise details of intermediate processes are not known.

The instruments have proven to be rugged and capable of operating hour after hour without overheating or altering their performance. A few tubes and fuses have been the only operating casualties. All units were operated for 100 hours before being placed in student use to eliminate

any components prone to early failure, a procedure of proven merit in all electronic instrumentation.

As far as the student is concerned, the prime achievement of the new system is the almost complete reversal of orientation from obtaining results to understanding and interpreting them. Instrumental failures rarely occur, apparatus is ever ready, and in a few minutes the necessary connections are made and records begin to come off in adequate volume for each member of the group to have a full set and for a certain discrimination to be shown in the niceties of recording. The records are instantly usable, so that questions of

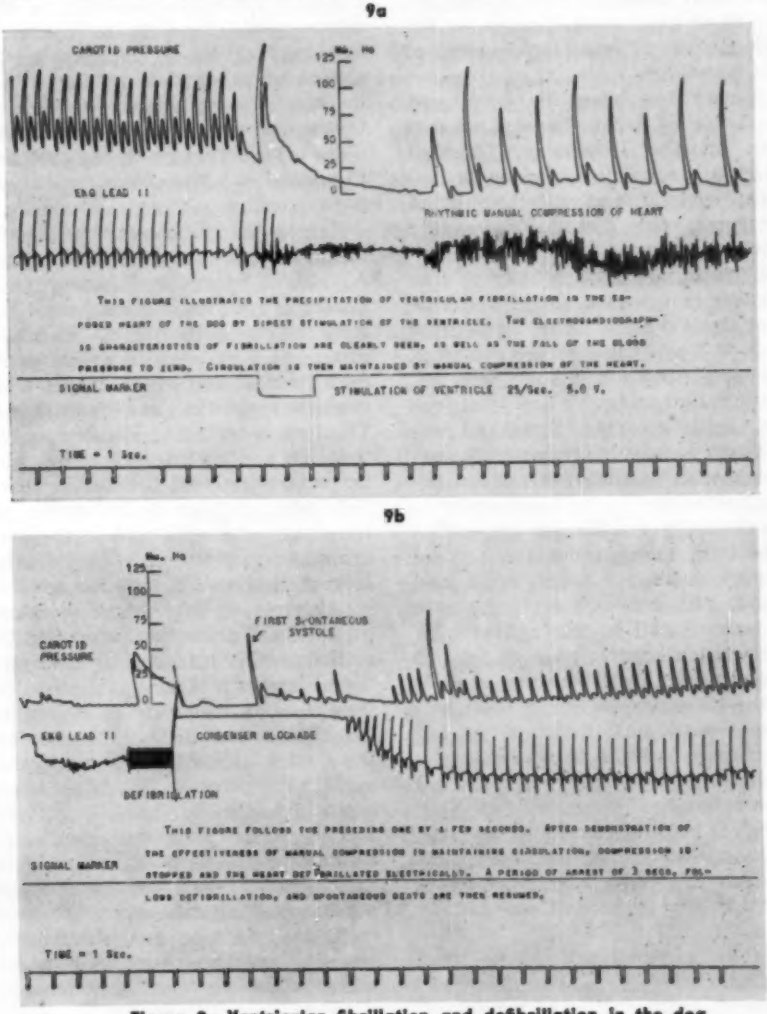


Figure 9—Ventricular fibrillation and defibrillation in the dog.

interpretation arise early in the session. With the de-emphasis on techniques of instrumentation the experimental preparation gets more attention, and its reliability increases; indeed what used to be considered to be the unreliability of the experimental animal probably can be attributed in large part to its neglect at crucial times because of the demands of the instrumentation, or the lethal effect of some requirement of the technique.

Second has been the broadened spectrum of what the student has seen in the laboratory. Classical items of everyday discussion in lecture; systolic and diastolic blood pressures, the dicrotic wave, the electrocardiogram, the electroencephalogram, are now equally routine matters in the laboratory. The student deals with the varying degrees of A-V block, can identify ventricular ectopic beats, and knows the full syndrome of auricular and ventricular fibrillation from first-hand experience, acquiring thus an acquaintance with prototypes of many syndromes that he will encounter in his clinical years. He has seen action potentials, mapped out the cortical sensory areas for touch, sight and sound, and has measured the rate of transmission in nerve fibers. He has written reports on a variety of topics using his laboratory records as the illustrations, and in these and other ways has incorporated his laboratory work as a functional part of his whole body of physiological knowledge.

Third, he has learned to use records as a source of data for future analysis. The ease of calibration in quantity and time and the facility with which large amounts of data may be accumulated, stored, and studied, have given him adequate material for quantitative treatment. Analysis of such fundamental principles as Starling's Law of the Heart and the refractory period of the heart, which in the past have been omitted because of difficulties with calibration or screening enough material on a smoked-drum record, can now be made a part of the most elementary laboratory exercises. On the other hand, the versatility of the paper speed control makes it possible to compress on a single sheet of recording paper data which would be cumbersome when recorded in the usual manner, and would require some form of charting in order to present it within reasonable compass.

Fourth, the student begins to learn to have recourse to experimentation. At almost every session, and with almost every group, questions of interpretation arise which can be solved best by some modification of experimental procedure, which with the new system can readily be made. Thus when recording simultaneously the EKG and auricular and ventricular contractions of the turtle heart it is often difficult to be certain of the order of events, and discussions are often precipitated regarding the correct designation of the several components of the turtle electrogram. These discussions can often be settled quickly by arresting the heart for a short period by vagal stimulation to note the order of events as the beat is resumed, or by slowing the beat sufficiently to separate the various components. To analyse such a record further by changing leads to accentuate in turn auricular and ventricular components is quickly accomplished, and the unchanged parameters help to orient the new data. In this way one observation leads to another, often into useful excursions into the experimental method.

Finally it has been noticed that students have brought problems into the physiological laboratory from other departments and disciplines. This occurs primarily during the project period when the departments of biochemistry and physiology together provide time for a project that may combine the two disciplines or be exclusively in one department. A number of groups carrying out endocrinological projects utilized their physiographs for assay purposes, as did another group utilizing the turtle heart for the bioassay of serum calcium. Another group inspired by pharmacology adapted Handley's method for determining the effectiveness of bronchodilator drugs. In so doing they are not only applying the techniques of physiology to more general use, but are demonstrating that their physiological thinking can be incorporated into their total activity, and that it is proving useful beyond the confines of the laboratory and departmental framework.

The instructor has been no less involved in the changing significance of the laboratory than the student, and in ways that form counterparts to the student's new activities in the laboratory and his attitude toward it. He, like the student, is less occupied with details of technique, and for the same reason. This seeming paradox of a highly developed instrumentation actually reducing time and effort spent on techniques has of course been recognized for some time in industry, and is seen in everyday life in such highly technical devices as the automatic transmission which simplifies driving even though few drivers understand the principles of its operation, much less have the ability to repair one. The instructor is called upon for on-the-spot discussions of the meaning of records obtained in terms of the physiology of the organism studied, and not in terms of the behavior of the apparatus. The laboratory session thus tends to assume the character of bedside teaching where the individuality of a phenomenon found in a particular patient is discussed against the background of the disease in general and its fundamental nature.

The instructor is now in a position to encourage and assist the student in those useful extensions of an experiment which open the door to the experimental method, both because more time is now available, and because the technical problems are more often and more simply surmounted. Thus the chief attribute of a good investigator, the ability to devise simple experimental solutions to problems as they arise, becomes again one of the chief tools of teaching, and aligns the laboratory sessions more closely with the main interests of the intructors. The large variety of unusual physiological occurrences that now present themselves to the student and instructor, in a completely non-scheduled manner, provide ample occasions for this kind of teaching, and, as a matter of fact often serve to start new lines of thinking in the instructor.

It is clear that the new system demands from the instructor, (a) broader interests and knowledge, (b) greater fertility in discussion and suggestions, and, (c) a greater depth of acquaintanceship with the broader subject matter of physiology, than hitherto. It rewards fulfillment of these demands by placing the student laboratory again at the frontier of physiological advances.

El fisiógrafo en la enseñanza de la Fisiología

El descuido que ha sufrido el laboratorio de Fisiología, en un siglo que ha visto tan enormes progresos en casi todas las esferas de

las otras ciencias, y un aumento tan inusitado de los fondos disponibles para la investigación, ha puesto en evidencia lo inadecuado de los instrumentos que aun se usan en esos laboratorios, y la necesidad de inventar otros nuevos que devolvieran al laboratorio de Fisiología su lugar propio en la Educación Médica. Aunque algunos esfuerzos se hicieron para mejorar los accesorios básicos y para introducir algunos nuevos (como el electrocardiógrafo o el osciloscopio) no se ha intentado hasta ahora una solución fundamental del problema mediante una recreación completa del laboratorio de Fisiología para estudiantes. Las encuestas llevadas a cabo sobre el particular entre instructores y administradores de las Escuelas, revelan, además, una actitud derrotista que refleja las frecuentes frustraciones que éstos sufrieron en sus intentos previos de mejorar la situación. Los autores del presente trabajo, profesores del Departamento de Fisiología del *Baylor University College of Medicine* (Houston, Texas), creen que dicho Departamento está en camino de producir una solución del problema con la construcción y uso de un nuevo instrumento, el *fisiógrafo*, el cual, por medios electrónicos, registra acontecimientos fisiológicos. La estructura, funcionamiento y aplicación de ese aparato están descritos detalladamente en este informe, que contiene, además, una serie de descripciones gráficas.

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Separatas de este artículo, en español, podrán obtenerse si son solicitadas por un minimum de 25 lectores.

By His Own Hand

The highest death rates from suicide in both sexes are found in Japan, Denmark, Austria and Switzerland and the lowest are reported in Ireland, Northern Ireland, Chile, Scotland and Spain.

Within the United States the rate for the white population is almost three times that of the non-white population, so states the World Health Organization according to a recent survey. The survey further states that more men are prone to suicide than women.

The Preceptorship System at U. V. M.

GEORGE A. WOLF JR.

History

THE PRECEPTORSHIP system may be defined for purposes of this discussion as student experience gained by living and working with a rural general practitioner. In Vermont in the early 19th century, the preceptorship system was started for the purpose of providing patients for study by medical students.[1] Although the word "preceptor" is defined as teacher, no records exist which describe his qualifications at that time. The term may have meant someone who was not qualified to lecture and receive a university appointment, or someone who lived at a distance from the medical college. Nevertheless, whether he was qualified to teach or not cannot be determined. He had access to the patient's bedside and permitted a student to accompany him.

Abuses in the preceptorship system in that period appeared to be either neglect on the part of the student, in working with the assigned preceptor, or assumption by the student of full responsibility for the preceptor's practice.

In May 1927, the University of Vermont College of Medicine faculty minutes reveal that the dean was concerned with the lack of local clinical facilities. In December 1928, however, a report of a faculty committee indicated that the preceptorship program was in operation and was approved by the faculty. In 1932, another faculty committee recommended that the preceptorship program continue. During the AMA-AAMC inspection in 1937, the lack of clinical facilities in Burlington was noted and the lack of faculty supervision of extramural experience was criticised.

It should be noted at this point that extramural experience included not only experience with a general practitioner, in his rural practice, but also experience at hospitals at some distance from the college of medicine. In 1939, the general practice preceptorship was stopped, but the rest of the extramural program was continued. Apparently, hospital experience was considered superior to experience with the general practitioner. That faculty supervision was not the crucial issue is apparent because the distant hospitals were kept in the extramural program.

In 1949, Dr. W. E. Brown, then dean and professor of preventive medicine at the college of medicine, initiated a study of rural practice by medical students as a special elective. The Lamb Foundation of New York City, was generous in supporting this program and its outgrowths. Ten students were sent out in teams to survey rural areas in need of a doctor. Each group wrote a report and pointed out the need for a doc-

tor in the area, describing the comunity's situation. (Of the 10 who were sent out, one is in the Armed Forces, three are in general practice in a rural area, and six are in specialties.)

In 1950, a few general practitioners were carefully selected to act as preceptors without pay or rank, and the program was tentatively started as a two-week elective to be taken by the students in lieu of a vacation. Several students availed themselves of this opportunity each year.

In 1954, the curriculum was altered so that the students could spend a month with a general practitioner preceptor or could take an elective in some other type of work in the college of medicine. Abruptly with this change in scheduling, approximately half of the class chose to work with the general practitioner. Interestingly enough, the demand for experience with general practitioners did not necessarily come from those students who had planned future work in this area. Many seeking this service planned to become specialists. During this same time, investigation into the wishes of approximately 100 premedical and medical students registered in the liberal arts college of the University of Vermont and the medical school, was conducted by questionnaire. During the first four years of college and the first three years of medical school, 2/3 of the students questioned were interested in going into general practice. The fourth-year students, however, indicated that 2/3 of their group were interested in a specialty.

The preceptorship program continues successfully to date with approximately half the class seeking service with general practitioners. A fourth-year student who has just completed his preceptorship says the following: "I believe this service to be the most valuable service that I have had so far this year for several reasons.

"*First*—It gave me a chance to see how medicine is practiced in rural areas as compared to the way it is taught in the University of Vermont, in a university hospital.

"*Second*—The types of diseases to be seen in the hills of Vermont are amazing—for example, I saw a case of Milroy's Disease, a presumed pheochromocytoma, an aneurysm of the thyroid artery, myxedema, hyperthyroidism, coronary occlusion, pityriasis rosea, herpes zoster and so forth.

"*Third*—Dr. X gave me a lot of responsibility. He let me make house calls by myself. Then we discussed the cases I had seen and he pointed out any mistakes or differences of opinion. He let me handle a case of diabetic acidosis and one of typical rheumatoid arthritis practically by myself.

"*Fourth*—Dr. X believes that a student should view the general practitioner not only in his medical practice but also in his role in the community. Hence, I was able to see how he participated in civic affairs, how he lives with his family, and how he handles some of his financial as well as social affairs." Still another student says, "The preceptoral program has definite educational value, giving the undergraduate an opportunity to apply his theoretical knowledge in actual practice. My time spent with Dr. Z has given me an opportunity to learn how the patient is being approached and treated as a whole human being. His disease is not being isolated and regarded as an interesting case, but emphasis is being placed continually upon how the body and mind cannot be treated separately."

One of the preceptors states, "The major objective of a preceptorship plan is to learn the so-called art of medicine in all its ramifications. This includes not only the relationship between the doctor and his private patient, especially in office and home practice, but also acquiring an understanding of the doctor's role among the families and communities with which he is linked, the economic and social circumstances of the population as it affects their medical needs and a host of other intangibles which relate to the proper practice of medicine. Perhaps it is not too much to suggest that such sympathetic awareness is among the factors distinguishing a true doctor from a student or a physician from a scientist."

He goes on to say, "Does the general practice preceptorship make more general practitioners? I don't know, and I'm not sure that I care. This is certainly one of the minor objectives. It may well be true that in many respects the general practice preceptorship is more important to the man preparing for a specialty than for those whose life work will be in this field."

Another preceptor writes, "I believe the purpose of the preceptoral program should be to acquaint medical students with not only medical problems of the G. P., but also his home life, and extramedical duties in his community."

Another says, "To a conscientious preceptor, the teaching of a full-time student associate may present a considerable task. The extra time required in carrying through the normal routine repeated many times per day can add up to considerable extension of an already long day. As a year-round program, therefore, it might prove to be beyond the average man's capacity. However, benefits accrue to the teacher as well as the student in the stimulation that such teaching always affords." He goes on to say, "For any deficiencies in complete scientific knowledge that the preceptor may offer, he can compensate adequately in the total education of a medical student by a valid exposition of the worth of a good medical history, and an intelligently complete physical examination, reinforced by only minor laboratory data. In the sphere of psychosomatic disease, the preceptor with his intimate knowledge of the patient, can do much to instill an understanding of total patient care. The willing student will learn that the difference between a good and a mediocre doctor often lies in the keenness of his powers of observation."

Comment

Two aspects of the preceptorship program are worthy of discussion.

The first is the program as a teaching method and the second concerns the content of instruction by this method. As a teaching method, the preceptorship program is extremely difficult to compare with the other methods of teaching. As conducted at the University of Vermont with the single student living and working with a general practitioner, it is a very unusual teaching situation.

Few students are permitted the privilege of commanding the time of an experienced physician, who has had teaching experience, almost exclusively for a period of a month. Students are flattered by the delegation of responsibility by the preceptor, but this may be criticised as lack of direct supervision. Considering the fact that the practitioner has a reputation to maintain, in his small rural town, he undoubtedly feels the responsibility for indirect supervi-

sion more than does the busy attending physician responsible for a ward full of indigent patients. The value of including the student in social as well as professional activities of the preceptor must be viewed in the light of the past experience and family life of the student himself. It is highly unlikely that the student will have a detached objective view of this experience. In most instances, the preceptors are pleased to have the students or they would not be in the program.

The precise evaluation of the content of the student's experience with the general practitioner (preceptorship program) is difficult. Although the experience with the preceptor serves to introduce the student to the responsibilities which a general physician carries, the student obtains a concept of the preceptor as a specific personality and probably generalizes little from his experience. Undoubtedly, the clinical material to which the student is exposed adds to his clinical experience. There is a question as to whether this experience might not be more readily and efficiently obtained in a hospital or outpatient department.

Recent information relevant to possible effects of environment on the natural history of disease, cure of disease, rehabilitation, and also the effects of individual illness on the community and family, has fostered a change in aims of medical education. This probably has been responsible for the increasing popularity of the preceptorship system as described above. It is apparent that bedside, hospital oriented medical teaching cannot prepare completely the physician to deal with the problems occurring in the home and the community.

Secondly and possibly more important is the lack of investigation of the patient's reaction to family and community situations. The effect of stress in the home or community on the natural history of disease has been seriously neglected so that our fund of knowledge in this area is small.

W. L. Fleming[2] states, "Part of our trouble in designing this program (for teaching a family physician's approach) has come from the difficulty in getting agreement upon the sort of training the general physician, or better the family physician, of the future should have."

In a report of The Undergraduate Education Committee of the Foundation Council of the College of General Practitioners,[3] this statement is made, "The education of the medical student must be related to the functions which the G. P. has to perform in modern medicine." However, as Dr. Fleming has indicated, we are not clear as to the sort of training the general physician needs. Much that he knows has been obtained by experience. His ability to communicate what he has learned by this experience is limited, through no fault of his own. We would be just as limited in discussing the salt depletion syndrome if we knew nothing of physical chemistry. Thus, not only is the general physician and of course the ordinary clinical teaching specialist in the medical college poorly prepared to communicate to the student that which general practice is about, but also the student is not prepared to embark upon his experience with a general practitioner. True, he experiences a different brand of medicine than that seen in a teaching hospital, but the teaching hospital is his standard of reference. He has difficulty in adapting to a patient oriented environment in contrast to a student oriented environment.

In describing the plans for the

University of Florida, Dr. George T. Harrell[4] states, "A university-wide theme of human biology is being used so that all resources of the university might be brought to bear to explore better methods of education of any person who might be used in clinical patient care in the local community as well as better methods of patient care." In a sense, in the preceptorship system we are throwing a student into unknown waters and making him swim. We should not delude ourselves that we are actively teaching total patient care by allowing the student a month's experience with a general practitioner. On the other hand, the value of exposing the student to an experienced physician, of demonstrating a way of life and of emphasizing the problems to be dealt with in practice cannot be denied. If the experience inspires the students to look into problems of practice or environmental stress with an academic eye, the experience is of superior benefit.

Summary

1. The history of the general practitioner preceptorship at the University of Vermont College of Medicine has been described.

2. The original purpose of the preceptorship system as a means of obtaining increased clinical experience for students is noted.

3. The current aim of the present program here and at other institutions of introducing the student to social and environmental medicine is questioned. The need for more adequate information concerning the relation of social and environmental stress and disease and the role of a general physician in a community is stressed. The values of a preceptorship system as it is now conducted is discussed.

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2. Fleming, W. L.: "Teaching a Family Physician's Approach by a Department of Preventive Medicine," *J.A.M.A.* 161:711-713, 1956.

3. Report of Undergraduate Education Committee of the Foundation Council of the College of General Practitioners, *Brit. Med. J.* 2:36-38, July 4, 1953

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El sistema de Preceptorado en la Universidad de Vermont

Este trabajo trata del uso de Preceptores en la educación de los estudiantes del Colegio de Medicina de la Univ. de Vermont, un sistema de enseñanza que data de 1928. El autor señala el desarrollo que ha sufrido dicho método, originariamente empleado sólo para aumentar las experiencias clínicas de los estudiantes, y que hoy día tiende más y más a familiarizar al futuro médico con las condiciones sociales y económicas del medio ambiente de sus pacientes. Se pone énfasis especial, en este trabajo, en la necesidad de impartir a los estudiantes información más adecuada y amplia en cuanto a la relación entre las presiones sociales, económicas y de medio ambiente, y las enfermedades; se hace además hincapié en el papel del médico de práctica general dentro de la comunidad, y se discute extensamente sobre los valores del método de Preceptorado tal como actualmente es allí llevado a la práctica.

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Separatas de este artículo, en español, podrán obtenerse si son solicitadas por un minimum de 25 lectores.

This article is adapted from an address at the Association of American Medical Colleges' 67th Annual Meeting, November 12-14, 1956, Colorado Springs, Colo.

Religious Aspects of Medical Teaching

GRANGER WESTBERG

DURING the past 10 or 15 years some rather unexpected things have happened in the relationship between medicine and religion. Ministers and physicians who previously have had only a speaking acquaintance are now discovering that they have quite a bit in common—the patient—and so they are beginning to converse on a professional level. We cannot at this time trace the history of that change to show the many events of the past 50 years which contributed materially to it. Suffice it to say that there has been a growing interest in the patient as a person, a whole person, with physical, mental and spiritual needs which somehow do not respond well to piecemeal treatment. A great many physicians, seeing the needs of the whole patient, are seeking new ways to minister more effectively to all these needs.

More than sermons

The clergyman also has become aware that there is more to his job than merely preaching sermons. He knows that only about 10 per cent of his week is spent preparing or delivering lectures and sermons. He has come to see that his theological education has not prepared him adequately for the 90 per cent of his week which is spent primarily in working personally with individuals. He knows he cannot remain aloof to personal problems, or handle them with pious platitudes. His parishioners demand that he get down out of his pulpit and work with them and their problems down where they are.

This demand that religion be made relevant to life has shaken the foundations of theological education. Within the short span of approximately five years almost every seminary in the United States has added a chair in pastoral care which is one way of describing the pastor's ministry to the individual. More than that, because it has been demonstrated that pastoral care can best be taught by the clinical method, seminaries which long enjoyed a picturesque location high on a hill outside the city walls, have suddenly realized that this is precisely where they should *not* be. At this moment a number of seminary boards are discussing how to move into the center of great cities close to laboratories such as medical centers, social agencies, industrial plants, community houses, etc. which will provide students with clinical material. In this way students will be able to test the validity of religious faith in actual contact with fellow humans in crisis situations.

It is no secret that theological educators are indebted to medical education for demonstrating how

theory may be made relevant to practice, by daily moving back and forth between classroom and clinic. In addition to this, theologians, recognizing that they never minister to a soul apart from a body, have invited physicians during the past 5 or 10 years, to participate in the instruction of theological students. We are convinced that such teaching by men of science has enriched our theological curriculum.

Physicians' blind spots

But it is at this point that we must speak frankly to medical education. As we in theology have been working more closely with physicians on a professional level, and have included them on our faculties and in frequent discussion groups we have discovered that just as clergymen have blind spots in regard to physical and psychological needs of people, so physicians have blind spots in terms of the philosophical or theological dimensions of the lives of their patients. So obvious has this become that we must select physicians who lecture to theological students with the greatest care lest the students lose respect for them and dub them, as they have, "mechanics."

Clergymen on the faculty?

Now that theological schools profit by the presence of mature physicians in their classrooms and clinics could it be that medical students might profit from having qualified clergymen related in some way to their educational program? If so how could this be begun and what would be the content of such teaching?

In simplest outline form the steps might be something like the following:

a. Begin the program by appointing a clinically trained chaplain to the medical center or hospital used by the medical school. (Chaplains who are approved by the American Hospital Chaplain's Association have had four years of college, three or four years of seminary, two to five years in a parish followed by a two year residency in designated clinical training centers.)

b. As the chaplain develops a teamwork relationship with individual physicians they will gradually use him in informal discussions with medical students on the wards.

c. Encourage the chaplain to have joint seminars on religion and medicine in which cases of mutual interest are presented.

d. When, after a year or two, the medical faculty is assured of the quality of the chaplain's work he might be invited to be a participating observer in certain courses, (psychiatry, gastro-intestinal diseases) he also may become an instructor, give a series of lectures, or lead discussion seminars in a more structured setting. The subjects of joint interest to religion and medicine are too numerous to discuss here in any other way than to list them.

Subjects of joint interest

1. *The role of the parish pastor in the hospital.*

(This would include actual case presentations describing vividly how clergymen of various faiths go about their work and also at what points the physician might assist them.)

2. The unique aspects of the hospital chaplain's role as he works in a special way both with medical personnel and parish clergy.

3. A brief history of the relationship of religion and medicine in both Christian and non-Christian cultures.

4. The art of professional conversation with normal individuals under stress. (This discussion would draw upon the resources both of Christian pastoral care through the centuries together with modern insights based on newer psychological discoveries.) (A method of presenting this material will include recorded interviews, studied with reference to religious concepts which color human behavior.)

5. Sex education and the family, or the doctor's role in such educational programs with youth groups, and married couples' clubs on a community wide scale.

6. The role of the physician in premarital counseling—developing the theme of physical, emotional and spiritual factors in the marriage relationship. The church's new interest in this field is significant because of its previous mishandling of the subject and its need now for a joint approach with medicine.

7. Functional illness as it is related to attitudinal factors which are often intertwined with religious concepts.

8. Faith healing, its philosophy, its exponents, its problems and relationship or lack of relationship to the Christian churches.

9. The broad area of morals and medicine—wth special reference to birth control, sterilization, artificial insemination, eugenics, abortion, and euthanasia.

10. The handling of grief—as related to terminal illness; involving problems of "to tell or not to tell," the ministry to close relatives and the Eric Lindemann theory of the "grief work" necessary for those who are bereaved.

11. When to call a minister or priest or rabbi and—when *not* to call a clergyman. (A discussion of when the physician may be of more help religiously than the clergyman.)

12. The Church's attitude toward psychiatry.

These 12 subjects could obviously fill more than 12 discussion or lecture hours.

Religion and medicine are so intertwined that the medical student who graduates without having an opportunity to confront most or all of these issues under a qualified instructor will be at a serious disadvantage out in practice. In almost all these areas listed he is considered to be some sort of expert. If he is expected just to pick up this information in dormitory bull sessions his information will probably not be very accurate. It is incongruous that his medical knowledge should be so accurate and up-to-date while his knowledge on religious matters which are so closely involved in his practice of medicine often stamp him as being quite *un*informed.

What exactly do we suggest should be the content of these lectures and semi-formal discussion groups with medical students? One way to find out would be to sit in on these classes, and this we strongly urge medical deans to do. As a sort of sample of what is said I should like to quote snatches of a lecture given a week or so ago to the University of Chicago freshman medical students. This is a voluntary series of five lectures attended by approximately 85 per cent of the class. This particular discussion is on "The Church and Psychiatry" and attempts to bring medical students up-to-date on the attitude of the Church toward psychiatry as of today, with the hope that it will stimulate him to keep abreast of new developments of which a medical student should be aware.

The Church's attitude toward psychiatry

The Church has been both irritated

and intrigued by the developments in the field of dynamic psychiatry. It was irritated particularly in the 1930's and 40's because some of the representatives of this new field made such extravagant claims for it and gave the impression that all their findings about the nature of man were unknown prior to Freud. But the Church was intrigued by psychiatry's almost uncanny ability to get behind the facade of man to the real person inside. The analytical approach has helped religion to understand more scientifically what it had previously perceived intuitively.

In the 1930's a typical parish clergyman was quite naturally irritated by psychiatry when a church member who was being treated by a psychiatrist would say, "Since I have gone into analysis I have come to see that my religious beliefs are very superficial." When he went on to describe his beliefs as having been "superimposed" upon him by his parents and other religious people it took a very secure pastor to be able to admit that this was in some degree true. It was true that this patient, and many others like him, *had* merely parroted religious statements which he had never been helped to examine. The doctrines of the church had never "spoken" to him personally. As distilled wisdom of the ages they should have added meaning to his life but instead they were kept in a separate compartment unrelated to the rest of his life experiences.

When the thoughtful pastor got around to reflecting on what this parishioner was saying, he began to examine his own teaching and preaching and realized that they were not related to life as they could be. Many of his present church members were merely parroting what he told them was true. This experience was typical of the kind that jolted him and many of his fellow pastors in a way that over a period of 25 years has brought about a rethinking on the church's total educational program, beginning with the very young child right on through the theological seminary. The rethinking process has sought to devise new ways to make the Christian faith relevant.

Psychiatrists have broken away from the established pattern of medical practice in order that they might wrestle with some of the basic causes of illness. By this revolt they have called attention to the fact that the average minister is spending far too much time making the wheels of an organization go around to the neglect of his pastoral care responsibilities. Of course the clergy were at first outraged at this attack upon their faithlessness, later they were chagrined as they recognized their own lethargy in matters of personal concern for individuals, and finally in humility, they expressed willingness to be taught by this renegade group. The next logical step in the process of helping people is to combine the insights of both psychiatry and religion.

The Church, says the late David Roberts of Union Seminary, appreciates that psychiatry is "documenting and widening our awareness of what the human race is up against in its attempt to reach inner freedom. It offers clinical details on some matters on which the Church fathers were either completely ignorant or only vaguely aware in their descriptions of human ills and perversities. Yet, strikingly enough, the means which have been employed in exploring the seriousness of the situation have at the same time been instruments of healing. If psychotherapy has widened our acquaint-

ance with the ramifications of 'sin,' it has at the same time widened our conceptions of how this bondage can be overcome. It is as though a full awareness of what is involved in being in psychological fetters were a key that opens the lock".[1]

Psychiatry has given us tools to help distinguish between a faith that is genuine and one that is false. We see what a tremendous role inner security plays in changing people's attitudes—how difficult it is for one who is insecure to allow his present system of values to be questioned lest the foundation on which he now stands be knocked from under him.

The Church has been smoked out by psychiatry regarding its stand on sex. While in 1930 there were almost no books available describing the Church's attitude toward sex, by 1956 a score of excellent works by serious theologians help us to understand the Church's position.[2]

Sex means more than merely physical relations. It is in a sense a mystery because it is always pointing beyond itself. While it may appear to be mere biology it actually contains at all times, even when least expected, a spiritual ingredient. When it fulfills its function we know it has somehow gone beyond what we anticipated.

Because a follower of Christ has been taught to love himself and his neighbor as himself he will try to resist the temptation to exploit any other fellow human for purposes which would degrade either of them.

The Christian knows about the problem of lust from personal experience. He is not proud of this but is grateful for the continuing forgiveness of God which he receives in his daily strivings against these temptations. The fact that he is never wholly free of these temptations or of the daily grace of God helps him to be more humble, understanding and forgiving in his relationships with his fellows.

To this end he strives to understand the peculiar problems of the sexual "deviate" which he sees as having their origin perhaps in deeper problems of interpersonal human relations.

The Christian person must never take sexual union lightly. It is always a serious and radical matter to the persons involved, to their relation and attitude toward God and the meaning of life. Whenever such union is entered into casually, or with animality, or spiritualized out of existence, then its true value cannot be appreciated. There is revealed in sexual union more of the other person's true self than in perhaps any other joint human act.

Sex is too often equated with sin. But sex is no more nor less sinful than other areas of human activity. However, because it impinges on so many aspects of the human personality it may appear to be more sinful than most other realms of human activity. When sex plays too important a role in the life of a person it always stands in danger of becoming an idolatrous thing and eventually a substitute for God.

The hope is that sex will be looked upon as a gracious gift which is given us to use as an open channel for mature and serious love. When used in the service of such a high goal it has a tremendous potential for

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1. Roberts, David: "Psychotherapy and a Christian View of Man," p. 110.

2. Based on the conclusions of Cole, Wm.: "Sex in Christianity and Psychoanalysis" and Hiltner, Seward: "Sex Ethics and the Kinsey Reports."

bringing about an unusual sense of happiness and even a sense of partnership with the Creator. Our Hebrew heritage with its down-to-earth conviction about the goodness of God's creation could never permit a categorical separation between spirit and matter in man's life.

These are some of the things we are saying to the medical students at the University of Chicago. We think they will help clergymen and physicians to understand each other better and thereby to serve the patient in a way which would otherwise be impossible.

Aspectos religiosos de la Educación Médica

Durante los últimos diez o quince años, ha habido desarrollos sorprendentes en lo que se refiere a las relaciones entre Medicina y Religión. Se descubrió que éstas tenían mucho más en común de lo que se solía pensar, y que lo más importante que tenían en común era el paciente. En lo que se refiere a la Medicina, fué sin duda la nueva tendencia, llamada *comprensiva*, con su énfasis en el paciente más que en la enfermedad, lo que más contribuyó a acercar el médico del cuerpo al médico del alma. Por otro lado, los teólogos, enfrentados con las complejas condiciones humanas de nuestra sociedad moderna, también advirtieron que su preparación teológica no era suficiente para satisfacer las demandas de sus parroquianos. El autor del presente trabajo, que ocupa la cátedra de Religión y Salud en la Univ. de Chicago, señala algunos hechos recientes, significativos, que demuestran una creciente cooperación entre la Medicina y la Teología. Por ejemplo, se ha demostrado que la enseñanza de la atención pastoral a los enfermos (que forma ahora parte de casi todos los seminarios teológicos de los Estados Unidos) puede llevarse mejor a cabo haciendo uso de los métodos clínicos, y en estos momentos un cierto número de seminarios están discutiendo cómo trasladar éstos cerca de los centros médicos, laboratorios, agencias sociales, etc., de las grandes ciudades, a fin de proveer a los estudiantes con material clínico, y darles ocasión de poner a prueba la validez de su fe religiosa, al establecer contacto directo con sus prójimos en situaciones críticas. Además, los teólogos, reconociendo que los cuidados del alma no pueden ser completamente separados de los del cuerpo, han invitado a los médicos, frecuentemente, en la última década, a participar en la instrucción de los estudiantes de Teología. El autor lamenta que por parte de la Medicina no ha habido hasta ahora tendencia tan marcada hacia la colaboración en la enseñanza, y sugiere algunos pasos que las Facultades Médicas y los Hospitales de enseñanza podrían dar en ese sentido, tales como el nombramiento de algún teólogo calificado, que tuviera experiencia clínica, para desempeñar la función de capellán en un hospital universitario, y el cual, después de haber probado sus aptitudes y utilidad, podría ser invitado por la Facultad de Medicina para dictar una serie de conferencias, sobre temas de interés común para la Medicina y la Religión. El autor cree que Religión y Medicina se hallan hoy día tan entrelazadas, que el graduado médico que nunca tuviera la oportunidad de enfrentarse con dichos problemas se encontraría en su práctica con serias desventajas. También señala el autor algunos cambios recientes fundamentales que tuvieron lugar en lo que se refiere a la actitud del clero frente a ciertas ramas de la Medicina, por ejemplo, su posición hacia la Psiquiatría y, particularmente, hacia el Psicoanálisis.

Introduction of the Concept of Comprehensive Medicine into the Curriculum

DONALD P. CONWELL, CLAUDIA PYE, BETTY LYONS AND WILLIAM GAVENTA

IN THE PAST decade the emphasis on specialization of organ systems has frequently led to the loss on the part of the medical student of the realization of the impact of illness on a patient and his family. At the same time the tremendous growth of social and welfare agencies has placed at the disposal of the practicing physician resources which can enable him to alleviate much of the ancillary stress of a disease and thereby return his patient to maximum efficiency more readily.

In the Tulane School of Medicine the concept of "comprehensive medicine" includes the prevention and alleviation of any kind of stress: social, economic, physical or psychological, as it impinges on those under the care of the practicing physician. This does not imply that he has the sole responsibility in this area, but it *does* mean that his responsibility is to know and use the organized resources of the community to the best of his ability in service to his patients.

The course

The course in Comprehensive Medicine is given to seniors in the time block previously alloted to preventive medicine. This amounted to a total of 36 hours spread over a six-week period of three two-hour sessions per week. Of the 36 hours scheduled, 18 hours were set aside for presentations of cases and two hours for orientation to the course. Student-faculty conferences required four hours, and the balance, 12 hours, was allowed for home visiting, agency contacts and organization of the case presentations. In addition to the 36 hours allowed for teaching, the two hours assigned for final examinations were used as a session for evaluation of the students' gains from the course and for brief follow-up presentations of each case studied by the group. The case study technique was used to obtain a maximum of student participation, agency and community involvement, and to avoid formal and didactic presentations.

During the summer of 1954, conferences were held with the agencies in New Orleans and problems of administration and operation which could be anticipated at this time were resolved.

Teams of students

In setting up the course the students were divided into teams of two or three, and, insofar as possible, were allowed their choice of a case to study and present. These cases had been selected by the faculty with a view to: (1) the direct educational value they would provide for the student; (2) the useful service the

student could render the patient by bringing the situation to the attention of agencies; and (3) the provision of adequate variation in problems in the series of presentations within each group. In addition, there was previous agreement by the patients that the students, "doctors-in-training," would be welcomed in their homes for the necessary collection of data.

The following case illustrates the technique used in the educational process in this course.

CASE HISTORY

Mary Wilson—41 year old female.

Chief Complaint: **Severe pain in stomach.**

Present Illness: **One day prior to admission to Charity Hospital, New Orleans, in March, the patient experienced a severe left upper quadrant pain. For 15 days before admission the patient had had an epigastric pain that was a persistent ache, not sharp or colicky. The pain was made worse by coughing, sneezing and deep inspiration but was relieved by belching and sometimes by vomiting. There was never any diarrhea, nausea or constipation. For two weeks prior to admission she had had a cough productive of a thick mucoid material.**

Patient's History: **In 1948 the patient had had a mass removed from her right breast. In 1933 her left leg was broken as a result of a fall. The remainder of the patient's history is noncontributory.**

Physical Examination: **Blood pressure 170/80, pulse 112, respiration 22. This is a poorly developed, poorly nourished female in acute distress. The pertinent findings were a distended abdomen with muscle rigidity, some rebound tenderness and extreme tenderness over the entire epigastrium. The white blood count was 16,000, hematocrit was 32, and the hemoglobin 13 gm./100 cc.**

Social History: **The patient was born in Natchez, Mississippi and moved to New Orleans at age 3. She had resided there since then. Her education stopped after the fifth grade. The patient has never married but is the mother of 6 children, ages 26, 23, 21, 11, 10 and 6. The children, ages 21 and 23 are married. The son 26 has a diagnosis of gastric ulcer. The children 11, 10 and 6 are unable to go to school because of lack of clothing. The patient has worked since the age of 16 as an ironer in a laundry. She has been consistent in her work and with the income has been able to support her children. The home of the patient consists of two rooms in a very poor section of the city with an outdoor toilet, no utilities, meager furnishings and little food.**

Course in the Hospital: **During surgery a left subphrenic abscess involving the stomach and omentum was discovered. A perforation of the stomach wall due to a gastric ulcer was found to be the cause of the abscess. Drains were inserted and left for 11 days and then removed. The postoperative course was uneventful. A postoperative G. I. series suggested the possibility of a cancer which was verified by the pathologist as adenocarcinoma with deep infiltration of the muscularis. With this information, on April 25, a subtotal gastrectomy was performed. On the May 1 there was an evisceration of the vertical gastrectomy incision which was repaired. The patient was discharged to her home on a bland diet, complete bed rest and morphine for pain on the May 25. She had no knowledge of her diagnosis.**

Final Diagnosis: **Terminal adenocarcinoma of the stomach.**

Classroom Presentation

This case was selected because of the woman's recent diagnosis and discharge and the numerous problems presented by the family structure and status. For obvious reasons, this patient was not "physically" present during the seminar.[1] Following the two-hour orientation session the two medical students who had chosen this case had a conference

1. In cases where it was felt that the existing patient-doctor relationships would not be disturbed and it would be profitable for the students to see the patient, the patient was invited to the seminar. A further learning experience was available to the students since the anxieties of patients being presented and their need for continued psychological support at the time of presentation was indicated to the students before they were allowed to bring in a patient.

with the physician and social worker for the purpose of discussing the specific case and of handling some of the tensions of the students attendant on their first home visit. Problems discussed included the elicitation of social and economic information concerning the patient and the preliminary exploration of agencies which might appropriately become involved in the management of this case. After an appointment had been made, the students visited the home, took a medical history, completed a physical examination, obtained a social history, and insofar as possible observed the impact of the disease crisis on the family struture. A subsequent conference with the same instructors was held, at which time the information gathered by the students was discussed and plans made for helpful intervention in this situation. For this family, the immediate need was clothing for three school-age children and financing for food until the state welfare agency could establish eligibility of the patient. For the students, the need was for alleviation of their anxiety caused by their recognition of the physician's limitations in this kind of situation.

The prompt aid given by a local church group in the form of clothing and food handled the immediate situation for the patient and in a large measure reduced the feeling of helplessness on the part of the students. The data from the histories and the results of the physical examination were organized by the students with the assistance of the instructors, and the necessary interviews with the agencies and physicians concerned[2] were conducted by the students. In addition, the students planned the manner in which these persons would describe their roles in his case during the seminar presentation.

At the time of presentation (this is a pattern which had developed spontanecusly among the students) one student presented the history and results of the physical examination and the other student gave his impression of the social history and the home problems. A brief discussion of the case as it stood at that particular time followed and the representatives of the agencies explained their potential participation in the management of the patient, clearly pointing out their limitations as well as their strengths. The chief of surgery in a didactic presentation, while admitting the helplessness of the mother's situation, pointed out the possibility of positive action on the physician's part when the *total* family situation was considered. The 26-year-old son who had a history of persistent gastric ulcer was felt by the surgeon to be a candidate for an exploratory operation to exclude a possibly existent precancerous or cancerous lesion. The discussion was opened to the entire group and additional questions were raised and referred to appropriate members of the panel of experts. At the end of the session, a summary of the highlights of the two-hour presentation was made by one of the presenting students.

At the time of follow-up the students reported subsequent subtotal gastrectomy on the 26-year-old son had been successful and that he was preparing to return to his job. After the patient's death the following March her three young children were placed in foster homes, as she has requested.

2. These included the Chief of Surgery in the Medical School, representatives from the American Cancer Society, the Department of Public Welfare, Social Service Department at Charity Hospital, and the church group.

Course evaluation

The faculty attempt to evaluate this course has included the questioning of students in four areas: attitude at the time of initiating the course, change in attitude or orientation since participation in the course, the desirability of an increase in time allotted to the course, and subjective evaluation of the significance of the course. Of the 131 students participating in the first year, the expressed attitude of 111 at the beginning of the course was either apathy, indifference or in some cases overt hostility to the idea of the course. At the end of the course there were only 14 of the 111 students who still had a negative attitude as indicated either by unfavorable answers or refusals to answer the questions. Eighty-two of the students felt that the amount of time spent in the course was adequate, 18 felt that they should have more time, 17 less time, and 14 stated they had no opinion.

The evaluation of the course on the part of students who were favorably impressed included statements which fell in three broad categories: first, that the role and function of the community agencies had been clarified; second, an awareness of the impact of disease on the family members other than the patient had been created; and third, the experience of considering the total situation of the patient in the framework of his own home had been worthwhile.

The negative statements were more specific, criticizing individual persons, i.e., longwindedness of certain experts, lack of final conclusions to cases, hostility to social work and/or preventive medicine.

Suggestions made by the students with regard to the course fell largely into the category of methodological problems. Some of the specific suggestions were that a mimeographed diagram of agency interrelations would be helpful, that field trips to the agencies would constitute excellent supplements, that at some later time the course might become an integrated part of all clinical teaching in the medical school rather than a separate entity, and that the selection of cases might be improved.[3] One suggestion, to have a physician practicing in the community select one of his cases for the group, was accepted and proved succesful. Many of the students felt that there was too much emphasis on the patient of low economic status. Actually, our figures show that approximately a third of the cases were indigent, another third medically indigent, and the final third independently able to handle the costs of the disease crisis. This would indicate that some attempt on our part should be made to instill in the students a recognition of the financial imbalance that the treatment of illness often creates in non-indigent familes.

The four members of the faculty have found that the amount of time needed for conferring with the 22 students in each block, with community agencies, with other departments in the medical school and with each other, consumes an additional 12 hours per week. A follow-up study by the faculty at the close of the school year to obtain sug-

3. Cases selected during the past academic year were as follows: glaucoma, poliomyelitis, mental illness, tuberculosis, heart disease, orthopedic problems, diabetes, arthritis, epilepsy, deafness, malignancy (terminal), rheumatic fever, cancer of the larynx, rabies, cerebral palsy, hypertension, sarcoidosis, diphtheria, pernicious anemia, stuttering, alcoholism. prematurity.

gestions about the course from agencies which had participated indicated that, despite the lack of honorarium and the approximately two to four hours time given to each student team, the agencies and their personnel have indicated a desire to participate another year, and a full approval of the methods and goals of the course.

In this paper, comprehensive medicine is defined as the prevention and alleviation of any kind of stress: social, emotional, economic and physical as it impinges on persons under the care of the practicing physician in his community. The technique of presenting to the students, via case discussion, the existing resources in the community helps to show to the student the role of the physician in comprehensive medical care. In the cases presented, the functions of vocational rehabilitation, occupational therapy, speech therapy, recreation for handicapped people, educational and judicial management, etc., have been shown. Students who have completed the course and continued with further clinical courses have used social service departments and agencies with a higher frequency than had previously obtained.

Summary

Within the existing framework of a medical school curriculum, without making excessive demands on the students or faculty or community, in time and money, we have been able to present a concept of *comprehensive medical practice.*

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Le Medicina Comprensiva como parte del curriculum de una Escuela de Medicina

En la Escuela de Medicina de Tulane University (New Orleans) el concepto de Medicina Comprensiva, se aplica a la prevención y alivio de toda clase de presiones, sociales, económicas, físicas o psicológicas. Esto no quiere decir que el médico haya de asumir entera responsabilidad en todas esas áreas, pero sí que debe conocer los problemas pertinentes y saber utilizar del mejor modo los recursos de que disponga la comunidad. El curso de Medicina Comprensiva es enseñado ahora a los estudiantes de dicha Escuela en lugar del de Medicina Preventiva. Abarca 36 horas, repartidas sobre un período de 6 semanas, de las cuales 18 se dedican a la presentación de casos; 2 a orientación de los estudiantes; 4 a discusiones entre éstos y los profesores, y las 12 horas restantes se emplean en visitas a domicilio, contactos con las agencias sociales y preparación de los informes. Los estudiantes trabajan en grupos de 2 o 3, y, en la medida de lo posible, pueden escoger los casos que cada uno quiere estudiar y presentar. Estos casos son previamente seleccionados por la Facultad, según los siguientes puntos de vista: 1) valor educacional intrínseco que ofrece al estudiante; 2) servicio efectivo que podría prestar el estudiante al paciente al presentar el caso a la atención de una agencia social, y, 3) provisión de una variación adecuada en los problemas abordados. Una descripción detallada de las técnicas y procedimientos empleados en esa enseñanza es ilustrada, en este trabajo, mediante la presentación completa de uno de los casos que estuvo a cargo de un grupo de estudiantes.

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Separatas de este artículo, en español, podrán obtenerse si son solicitadas por un minimum de 25 lectores.

The Place of Anatomy in an Expanding Medical Curriculum

C. P. MARTIN

ANATOMY IS AN old science; it began with the ancient Greeks some 2500 years ago and its early progress was rapid. This is easily understandable. The first medical facts likely to impress themselves upon primitive people are the form and parts of their own bodies and the effects of eating certain plants and berries. Accordingly, anatomy and botany became the first medical sciences. The alchemist's search for the elixir of life added a crude chemistry to the list. These three—anatomy, botany and chemistry remained the only basic sciences taught in medical schools down to almost the end of the 18th century. Of course we need to remember that the term anatomy was at first used in a broader and more general sense than it now enjoys. It originally denoted what we today would call human biology. It studied all phenomena of the human body, its functions as well as its form, the diseased as well as the healthy body. It therefore comprised what little physiology was then known and a good deal of gross pathology or morbid anatomy, as that subject was then called. The Hunterian Museum, for instance, was from the start almost as much pathological as anatomical.

Gross anatomy progressed

In this old and comprehensive science of anatomy, what is now called gross anatomy progressed far ahead of the other branches of the subject. For this the reasons are simple. Gross anatomy is in fact basic to all other medical sciences. One cannot study the function of parts and especially their functional interactions until one knows what parts there are. One cannot study the changes which disease or injury produces in an organ until one knows what the normal, undiseased and uninjured organ is like. Furthermore, the acquisition of knowledge in gross anatomy did not have to wait on the progress of any other science. It could be pursued independently and without intricate apparatus and delicate instruments. By contrast there could not be a scientific physiology, biochemistry, pathology or histology until the sciences of physics and chemistry had reached a quite advanced stage of development. Consequently gross anatomy was a very complete science before physiology, biochemistry and histology got started. Around the beginning of the 18th century scientific progress in all its branches became more rapid. Inevitably the new knowledge in physics and chemistry and the new means of measurement began to be applied to the study of the human body. Hence it was that at this time branches of learning which formerly had been regarded

as parts of anatomy gradually formed themselves into separate and distinct sciences and detached themselves from the older comprehensive discipline.

Medical schools, in the modern sense, are therefore of comparatively recent origin. In olden days people wishing to become medical practitioners apprenticed themselves to a physician or apothecary or to a surgeon and learned their profession from him. Physicians or surgeons holding a hospital appointment and consequently having access to more abundant and varied teaching material obtained more numerous apprentices and probably those of a better type. They seem anyhow to have had many more than the general practitioners. It was obviously easier and more convenient to teach some subjects such as anatomy to a whole class collectively than for each physician to try to teach his own pupils alone. From such considerations the hospitals founded schools in which lectures were given on anatomy, botany and chemistry. The lecturers, however, were for a long time themselves practicing physicians or surgeons. Some hospitals became affiliated to one of the universities which founded medical schools for their students. Lastly, a few physicians ran their own private schools. Many of these students went into practice with no other qualifications than their completed indenture, but those seeking a university degree or a diploma from one of the Royal Colleges had to pass an examination.

Moore[3] tells us that in 1820 the students attending St. Bartholomew's Hospital, London, were of three sorts. First, already practising physicians and surgeons anxious to increase their own knowledge and experience. Secondly, apprentices of the physicians and surgeons on the hospital staff. Thirdly, university students holding or proceeding to a degree who were authorized to attend. A few apprentices of outside practitioners were also admitted. The second group was by far the largest and comprised three apprentices of physicians and several hundred apprentices of surgeons. The reason for this disproportion seems to have been that anatomy was the principle subject taught. The surgeons recognized their need of anatomical knowledge but physicians esteemed it as of no account. On this point the modern physician has been more faithful to the traditions of his forefathers.

Breaking into subjects

The breakup of the old comprehensive anatomy into a number of separate and distinct subjects, of course, took time. Physiology was the first to gain recognition as a distinct field of study. The first professor of physiology in Edinburgh was appointed in 1772[4]. Dublin founded a Department of the Institutes of Medicine, in other words, physiology, in 1792.[3] Cambridge established a sort of physiological laboratory in 1705 in which Stephen Hales experimented, but it was not till 1883 that a professor was appointed and physiology became no longer a branch of anatomy[5]. Once started the fragmentation proceeded. Physiology gave rise, in time, to biochemistry and biochemistry to endocrinology. As soon as microscopes were perfected, microscopic anatomy became the distinct subject of histology. Strange to say, morbid anatomy or pathology was late in being recognized as an independent discipline. It was not till 1885 that Dublin founded a lectureship, soon elevated into a professorship, in pathology. Even as late

as 1917 the *Journal of Anatomy and Physiology* was still a single publication and only then did it separate into the *Journal of Anatomy and the Journal of Physiology*. Thus what a 100 years before had been a single and comprehensive science became a dozen or so separate subjects.

The bare bones

From an anatomist's point of view the most unfortunate feature of this secession of new disciplines from the old comprehensive anatomy was the fact that it was precisely in those areas of human biology where knowledge was least advanced and the prospects for profitable research greatest that the various new sciences arose. They expropriated vast areas of what had been anatomy and always those areas in which most remained to be discovered, leaving to the new anatomy the bare bones of the already exploited gross anatomy.

The new anatomy began to look very like a closed and finished science. It is extremely difficult to find a single problem in gross anatomy which has not been already investigated and reinvestigated most thoroughly. It is true that there is still room for research in both histology and embryology and that these subjects sometimes remain loosely attached to gross anatomy. But in the British Isles, histology has been expropriated by physiology and in many American universities it is organized as an independent subject. Embryology also is now often a separate discipline. Most modern anatomists with a turn for investigative work either become immersed in the mazes of the central nervous system or turn to straight physiological or even pathological problems. The late Professor Woollard of University College, London, was once asked to define anatomy. He replied that 'anatomy is that which interests anatomists.' A satisfactory definition in one way for it allows the anatomist to do what he wants but it amounted to an admission that gross anatomy offers little opportunity for worthwhile research.

Of course it is impossible to say that any science is closed and finished. Anatomy relates not only to the medical profession, it is also a branch of zoology. The publication of the theory of evolution and the discovery of the remains of several prehistoric races of man generated a great interest in the comparative anatomy of man. The similarities and dissimilarities of his body to those of the higher apes became popular topics of debate. Influenced by this new interest many anatomists turned aside from the medical and surgical bearings of their science and devoted themselves exclusively to physical anthropology, and numerous anthropologists who were neither medical graduates nor interested in medical problems entered on the anatomical field. This development gave a new life to anatomy and new zest to anatomists. Unfortunately the openings which it made for research suffer from a serious limitation. They really are only accessible to those who are within reach of one of the larger and better equipped museums of natural history. Such museums are few and far between.

Furthermore, as touching the place of anatomy in the medical curriculum, the new development was definitely unhelpful. It tended to turn anatomy into a pure science unrelated to medicine and surgery, or at least whose connections with these disciplines are neither mentioned or stressed. Many anatomy departments became staffed entirely with non-medical personnel and many teachers

who were medical graduates became engrossed in physical anthropology. Anatomy and medicine were no longer so closely and inseparably connected as they had been. This would not matter so much were the amount of anatomical detail which a medical student should learn not so immense. In the time at his disposal he has no time to spend on anthropological details, however interesting they may be. Anatomy, in the medical curriculum, must give priority to matters of medical or surgical significance, and this in effect means that such departments should be staffed mainly by medical graduates who retain an interest in medical and surgical problems.

How to attract graduates to the field?

This poses a fresh acute problem for modern anatomy departments. It is becoming increasingly difficult to attract or entice promising young medical graduates into working in anatomy departments. For this there are two reasons. First, the road to scientific prestige and fame, to public recognition, to feliowships in learned societies and to academic advancement is paved with publications. Understandably therefore, young and ambitious medical graduates with leanings towards academic work crowd into the disciplines in which, for the moment, research is most active and most likely to afford them the opportunity of publishing several papers. The opportunities for research in gross anatomy seem, for the moment, almost exhausted and any research that still is possible in this field is both slow and time consuming. Rapid and copious returns are not to be expected.

There was a time when we had an abundance of young surgeons eager to demonstrate in the anatomy department for several years as a means of perfecting their own knowledge of the subject. In those days no young surgeon stood a chance of a hospital appointment unless he had served in this capacity for some years. Apparently a different outlook rules today in surgical and hospital quarters.

The second reason for the reluctance of medical graduates to embark on work in an anatomy department is that the remuneration offered by the university for such service, especially to the junior ranks, is utterly disproportionate to what these young medical graduates can earn in practice or industrial appointments. It is not, of course, suggested that the remuneration paid to academic personnel should be exactly equivalent to that paid to industrial doctors and practitioners. Academic personnel receive many perquisites beside their salary. They lead less arduous lives, have regular hours, enjoy a greater security, benefit by pension schemes and group insurances, have more leisure and longer holidays. It was the lure of these advantages which, in past days, decided many persons to enter on an academic life. They were willing to accept a lower income in order to enjoy regular hours and long summer holidays. But in some quarters there is a growing tendency to try run science departments in a medical school as industrial concerns are run. Everyone is to be in on the dot of nine, stay on the job till six, peg the clock and take a month's or three weeks holiday in the summer. This might not be unreasonable if the department paid salaries equivalent to those paid in industry or earnable in practice. It is palpably unworkable when the department pays nothing like those salaries. This does not mean that a reasonable discipline

cannot be maintained in a department or that its head cannot know what work each member is doing. It does mean that the attempt to run a scientific medical department like an industrial workshop usually defeats its own purpose. As a matter of fact all teachers in science departments do an immense amount of work connected with their subject, reading and revising, etc. in off hours and on their own time.

The uplift which anthropology gave to the study of anatomy did little therefore to rehabilitate its standing in the medical curriculum, and its position there was coming under constant attack. The breakup of the old comprehensive anatomy into a number of separate subjects was, of course, both inevitable and advantageous. It was rendered inevitable by the rapid and enormous increase of knowledge in each of these subjects which made it impossible for a single man to cover them all, and it was advantageous because it made for intensified research, a greater expertness and probably improved teaching. Nevertheless it was attended with some inconveniences. The first is the rather academic point that since human beings are integral units, the isolation of any aspect of human bodily activity, in effect, creates an artifact. In practice, however, this is insignificant for though each specialist may study a single bodily activity he views this activity as a part of a larger whole. All the same, the psychiatrists' warning that we should study the whole man and not his separate parts and functions may not be untimely.

A more serious inconvenience arises from the fact that specialists find it difficult to maintain a sense of proportion when the relative importance of their own specialty comes into question. The replacement of a single and comprehensive discipline by a number of separate and independent ones lead inevitably to a rivalry between these separate jurisdictions for space, equipment, staff and for time in the undergraduate medical curriculum. The human mind is so constituted that what is near to ourselves seems more important than what is more distant. Hence new facts and new discoveries always at first receive an exaggerated valuation, either for good or ill, and it takes time for their true magnitudes to appear. The new subjects which have grown out of the old anatomy are all immovably convinced that their new facts are of greater importance than the old anatomical ones. Possibly some of them are. However this may be, charges that anatomy teaches great quantities of trivial and unnecessary detail, that it imposes so demoralizing a load upon the student that it impairs his ability to study other subjects and that it occupies far too large a period in the curriculum, came to be freely and repeatedly laid.

Postgraduate study

There was a time, not so long ago, when so little was known scientifically in medicine and in the basic medical subjects that it all could be conveniently taught in an undergraduate curriculum of four or five years, duration. In those days the practice of medicine was regarded as, in the main, a single and comprehensive undertaking. Of course there were a few specialists who devoted themselves to restricted areas of medicine and undertook postgraduate studies in their specialty. But these postgraduate studies were exclusively clinical. They consisted of attending places where a great many cases falling into a particular

specialty had been collected. Thereby the student in a short time saw and became acquainted with a far greater number of cases than he could see as an undergraduate or would be likely to see in many years of ordinary practice.

Broadly speaking, there were specialists for the rarer and more unusual types of illness, not for the commoner ailments, for every medical student saw an abundance of the latter. In this setup the function of the undergraduate medical curriculum was esteemed to be the training and education of the general or basic doctor; the man with a wide and comprehensive knowledge of the whole field of medicine which included a nodding acquaintanceship with the specialties. To postgraduate study was ascribed the function of imparting a richer and fuller clinical experience of the rarer ailments than the undergraduate curriculum could afford.

It seems to me that though the scientifically known factual content of every department of medicine and every basic medical science has multiplied a thousandfold within the past 100 years and though the actual practice of medicine has become divided into a couple of dozen widely different skills and bodies of information, we still cling to our former concepts both of the organization of the medical profession and of the functions of undergraduate and postgraduate medical education respectively. We still regard the practice of medicine as, in a sense, a single and comprehensive undertaking.

It is true that no doctor can now call himself, or be registered as, a specialist unless he has undertaken postgraduate study in the specialty concerned and obtained his certification therein, and the institution of this rule was undoubtedly a forward step. It is also true that no doctor is likely to obtain a hospital appointment in one of the specialties unless he has obtained his certification therein. But there is no legal bar to any medical graduate undertaking work in any specialty. In the eyes of the law he is equipped to undertake any medical task though he may leave himself open to civil action for malpractice.

Even if the specialty in question is one requiring hospital facilities, he may induce a hospital to let him in, or he may set up his own clinic. And, indeed in a country as large and sparsely populated as Canada, doctors in many areas are forced to trespass on many specialties for the simple reason that no specialists are within their reach. Their usefulness to the community would be gravely lowered if they did not undertake much specialist work. Added to all this is the fact that the lines of demarcation between the specialties and between them and general practice have never been defined. It would be extremely difficult to define them and their proper location would almost certainly be a matter of many legal battles. Even in a city as well furnished with doctors of every sort as Montreal, we sometimes see general practitioners trespassing deeply into one or the other of the specialties and we see specialists of many sorts poaching on the ground of general practice.

Slow progress

No doubt the medical profession is, in this matter, slowly putting its own house in order. Certification of specialists goes on apace and it can reasonably be hoped that in a few years no medical man will, except in cases of great emergency such as the unavailability of suitable special-

ists, undertake work in a specialty in which he has not been trained. Here, however, we run into the second of our anachronistic concepts. We still regard graduate training in one of the specialties as being almost exclusively clinical with, at the utmost, a little revision in one of the basic sciences. The factual content of every basic science has increased enormously. Every specialty in medicine demands a far more thorough knowledge of the content of one or more basic science than is necesssary in either general practice or the other specialties. The teachers in each specialty expect their students to know the factual content of these basic sciences. But little or no attempt is made in the postgraduate teaching programs to teach it. The responsibility of teaching it is thrust back upon the undergraduate curriculum. In other words, present postgraduate teaching programs in the specialties make no attempt to lighten the load which the enormous increase in the content of the basic medical sciences has thrown upon the undergraduate curriculum, a load which is increasing every day. Possibly such programs may include a course in one of the basic sciences but such courses are conceived of as merely a revision with a few refinements of what the student learned as an undergraduate. This compels the undergraduate curriculum to include, as best it can, the teaching of much material which is necessary only to a few specialists.

The weakest point

I venture to suggest that the deficiencies of our present postgraduate teaching programs in the specialties is by far the weakest point in modern medical education and the weakness imposes an intolerable burden upon the already overloaded undergraduate curriculum. It is for this reason that I hazard the opinion that discussing and revising the undergraduate curriculum in isolation is a fruitless waste of time and verbiage. The scope, content and aims of the undergraduate curriculum are contingent on the scope, content and aims of postgraduate teaching in the specialties and on the organization and actual workings of the medical profession itself.

The three matters should be considered together for they are intimately and intricately interrelated. We will use anatomy as an illustration. It would be possible and highly advantageous to reduce the teaching of anatomy in the undergraduate curriculum to what is required by a good general practitioner if, first, we could be sure that those who had taken the undergraduate curriculum and no more, would never, except in very exceptional circumstances of great emergency, venture to undertake surgical operations, and if, secondly, we were assured that those who later on go into surgery receive in their postgraduate surgical training an adequate training in anatomy. At present, of course, neither of these "ifs" is evenly remotely realized. Indeed, so far are some surgeons from grasping the fact that postgraduate specialist study in any branch of surgery should include a long and intensive course in the anatomy concerned that they greet the bare suggestion with a look of pained surprise, and the Royal College of Physicians and Surgeons in Canada a few years ago abolished the separate primary examination in anatomy and physiology for those proceeding to their fellowship in surgery. I fail to see how the latter decision can be regarded otherwise than as a very shortsighted and retrograde one.

At present, therefore, basic science departments in the medical school are constrained to give as full, as comprehensive and as detailed courses in their sciences as is possible, even though much of this knowledge may later on be needed by only one or two members of the class. They are constrained to do so because, first, every member of the class is, at least legally, entitled to undertake the clinical activities in which such knowledge is necessary, and, secondly, because those members of the class who later do go on into a specialty and take postgraduate courses in it do not receive the information elsewhere.

This situation applies not only to anatomy but to every basic medical science department. They all of necessity include in their courses much that will later on be needed by only a few of their students. How much physiology, for example, does an otolaryngologist need to know? How much bacteriology need a neurologist know? How much pathology is essential to a psychiatrist? Each specialist argues that the time spent in learning facts that are not essential to his specialty is time wasted and urges the dropping of this particular matter. He fails to perceive that at present the undergraduate curriculum has to prepare students for every specialty and for general practice as well.

Unnecessary detail

To the charge that anatomy is the principal offender in teaching unnecessary detail a practical answer is available. This is to examine a large and random sample of the medical profession on the papers in basic science set in any of our medical schools last year to the first year students. It would not be fair to expect doctors who graduated some years ago to achieve a passing mark in any of them. They have given these matters very little thought for many years and none of us is as bright as when we were students, for it is a sad anatomical fact that the number of our cortical cells diminishes rapidly after we pass 30 years of age.

But the extent to which they now are capable of attempting to answer each of these papers is a fair index of the extent to which they, in their professional work, have had to use and therefore retain the information which each of these basic sciences contain. I am reasonably sure that the majority of doctors would make a better attempt at answering the anatomy paper than at answering either the physiology or biochemistry one. I may be wrong in this, and do not imagine that I seek to belittle the importance of either physiology or biochemistry. I simply feel that such a test will reveal how baseless is the charge that anatomy is relatively the greatest teacher of unnecessary detail.

Besides, most of us perhaps are too ready to believe that the acquisition of information which we do not afterwards consciously retain is a useless waste of time and energy. But knowledge once gained is never or seldom completely lost though it may drop out of our conscious memories. I usually warn the incoming students that in 12 months they will imagine they have forgotten about 85 per cent of what they learn in the dissecting room. Actually most doctors retain more anatomical knowledge than they realize. It is the same with every other part of the body and every other basic science. The broad and salient features stay, the details slip out of our conscious memories but they are still with us.

ready for recall at short notice and even directing our thinking while still unconscious.

In every science there is a basic number of facts which have to be learned and thoroughly assimilated before any further progress can be consolidated. In botany or zoology the student is, or I believe should be, required to study in great detail a number of type specimens. Admittedly it is not necessary for him to retain every detail that he thus learns, but a study of this detail at least once is necessary to give him a thorough grasp of the organization of the vegetable or animal kingdoms. To gain a complete understanding of many chemical processes it is necessary that a student study one example of each process with great thoroughness. He may afterwards forget the exact details of the example he studied but he retains an understanding of the process. If the number of basic facts in anatomy seems disproportionately large, it is because these facts are not only basic to anatomy but basic to physiology, pathology and endocrinology as well. Abolish anatomy and the physiologists and pathologists would have to spend a large proportion of their time teaching it. There was once a course in physiology given in McGill to arts and science students who had received no instruction in anatomy and the physiologists complained bitterly that half the course time had to be spent teaching anatomy. Apart from everything else, anatomy introduces the student to a vast new vocabulary and thereby lightens the tasks of all other basic medical sciences.

Fierce pressure

Nevertheless, the truth is that the enormous increase of the factual content of every basic medical science has, in the present setup, generated a fierce pressure in the curriculum which now has almost reached the breaking point. *That pressure could be relieved if the undergraduate curriculum restricted itself strictly to the training of general practitioners and all the matter in the basic sciences which relates only to one of the specialties was relegated to the postgraduate training in the specialty concerned.* This, of course, would involve a drastic alteration in all postgraduate teaching in the specialties and it would also necessitate some means of insuring that general practitioners were restrained from practicing in the specialties. Without a fulfillment of these provisions, it is hard to see how the present teaching of the basic sciences in the undergraduate curriculum can be reduced without seriously impairing the calibre of our medical personnel.

But in suggesting that it is our postgraduate training in the specialties which stands in the most urgent need of revision and expansion, I am not suggesting that such courses should be prolonged beyond their present length. I mean only that their actual teaching content needs to be considerably increased so as to relieve the undergraduate curriculum of the task of teaching those parts of the basic sciences which relate only to such specialties.

The present postgraduate courses are, in the opinion of many, unnecessarily long. At the present moment it takes a candidate who seeks to qualify as a specialist, from 12 to 14 years from the day he enters the university to do so. Obviously this lengthy apprenticeship cannot be extended. I even wonder whether the time is not near when we shall be compelled to allow some special-

ization in the final undergraduate year. An engineering student, at the end of his second year, has to choose which branch of enginering he wishes to proceed in and devotes his last two years to specialist instruction in the branch he has chosen. Is it then unreasonable to suggest that at the end of their third year medical students should choose the branch of medicine they wish to pursue and that the teaching in their final year and their final examination should concentrate on the branch which they have selected? If this plan were adopted general practice could then become itself a specialty on a par with all others and the students which selected it could receive much useful instruction in minor ailments at the outpatient departments in their final year.

There is, however, another matter that calls for consideration. May not the principle of discarding everything that is not of proven usefulness in our practical concerns be pushed too far? There comes a stage when we are all inclined to echo the words of King Lear:

> O, reason not the need, our
> basest beggars
> Are in the poorest things
> superfluous.

If we teach no more than what is of established practical utility, we shall be training technicians; and we all, I think, agree that however wide or narrow the field of their professional activities may later on turn out to be, the products of our medical schools should be more than technicians. They should be educated men and women, people with some degree of scholarship, people of wide sympathies and understanding, with cultural interests, mature and balanced in judgment.

In any ideal scheme of medical education place must be found for the civilizing and cultural subjects, the liberal arts or what used to be called the humanities. For this reason most scholars would frown on any proposal to reduce the time spent by medical students in the faculty of arts and science. For historically the faculty of arts is the custodian of the liberal arts or humanities. Where, if not in the faculty of arts will a student acquire a broad, civilizing, cultural education? Some are even for adding to the present required courses in the premedical syllabus. Compulsory Latin has its advocates and other subjects such as sociology and psychology have strong champions.

In the first Arthur Hall memorial lecture delivered last March in Sheffield University, England, Sir Francis Walshe took a different view. In his opinion the universities as a whole, in England anyhow, are, and I quote his words, "approaching ever closer to the idea of a polytechnic and to be developing an intellectual climate not wholly favorable to that generality of understanding which is the essence of a civilized culture." And he believes that the ethical and humanistic elements which the medieval medical schools once imbibed from the universities and which the universities are now in danger of losing, still persist in medicine and in the faculties of medicine and can now be repaid by them to the universities.

Without going all the way with this opinion, it is perhaps true that the champions of the premedical course in arts and science sometimes take a rather unrealistic view of its cultural value. I do not for a moment deny the cultural and humanistic value of an honors course in history or philosophy, or the classics, or in modern or ancient languages.

But I confess that I am more sceptical about the cultural value of a pass B. A. or B. Sc. I do not know whether you have ever tried to plumb the depths of an average B. A's culture. Nor do I think that those who have studied, even intensively studied, sociology or psychology are noted for humanistic and cultural attainments. And to the study of a dead language like Latin, the all or nothing law applies perfectly. One either knows it well enough to read it with pleasure and profit or one really does not know it at all. I graduated from a university where Latin is compulsory. But very few of us mastered that language sufficiently to be able to read it with any ease.

Difference between technician and scholar

On the other hand, one can agree with Sir Francis to the extent of asserting that the undergraduate medical course, properly handled, can be as highly cultural and humanistic as anything in the faculty of arts, and if it is not, that the fault lies with the teachers. For what is the essential difference between a technician and a scholar? The technician may equal or surpass the scholar in a command of the science of his time and in mastery of contemporary skills. But he knows little or nothing else, and because he knows little else his outlook tends to be narrow and his sense of proportion undeveloped. He can talk of nothing but his own work. An interest in, or sympathy with, the thousand other human activities are beyond his range. He is apt to think that the knowledge in his science is final and absolute. He has knowledge but not understanding; skill but not culture. Yet we must not underrate him. Good technicians are valuable members of society. But they are not scholars or leaders in human progress and civilization.

And what of the scholar? The scholar sees his subject within the framework of human history and the record of all human endeavor. He takes the historical view, the historical approach. He appreciates how painfully and slowly our present knowledge was acquired. And, knowing these things, he is humble about our present knowledge for he realizes how incomplete and tentative it is and how our great grandchildren will smile at many of the notions which we cherish. From his knowledge of the human story there comes a wisdom in the ways of men, a tolerance of their foibles, an insight into their pettiness and also into their greatness. How is it that so many of the outstanding personalities in medicine, men like Osler, were passionately interested in the history of medicine? Or was it that their wide knowledge of the history of medicine generated the broad understanding and deep wisdom which made their personalities so outstanding and bestowed on their teachings the high cultural and humanistic tone which distinguishes them?

Recapitulation theory

I am, as some of you may know from other sources, a firm believer in the Recapitulation Theory, or its equivalent, the Law of Parallel Embryological Development. Briefly stated, this theory postulates that the development of the individual from ovum to adult recapitulates, in a much abbreviated and telescoped form, the evolutionary development through which its race passed in bygone ages. In the human, for ex-

ample, a pronephros precedes the mesonephros and a mesonephros precedes the metanephros just as they did in the evolutionary history of our race. The pronephros now in the human embryo is functionless; it appears for only a few hours then regresses. Completely useless, you might say, cut it out. Not so, for if the pronephros is removed the mesonephros and metanephros never develop. Surely something of this recapitulation theory applies to education, taking education to mean the transmission and progressive development of a cultural heritage. Our civilization and culture are the products of a long history and they can be fully developed in future generations only by some recapitulation of that history. It seems to me that the great personalities and teachers in medicine, the men who have left the deepest and most abiding mark upon our profession, consciously or subconsciously, sensed this truth. They took the historical approach to medicine and all their teachings and influence were informed with the historic point of view.

A university, or any faculty in a university, is, or certainly should be, more than the sum of its curricula. It is at once the nursery, the guardian, and the vehicle of a cultural tradition and heritage which is in part common to all universities but to which each individual university gives its own overtones. A heritage which cannot be expressed in curricula for it belongs to the imponderables. But it is revealed and reflected in the lives, the attitudes, the outlook of the university's sons and daughters. It can be transmitted in some degree to others by contagion, by the example of, and contact with, those in whom it is already developed. But it can be most fully developed only through an acquaintanceship in some measure with the many generations of personalities from whose lives and wisdoms it slowly distilled. If the teachers in our undergraduate medical curriculum are themselves imbued with the traditions and record of our profession and instill the same spirit into their teachings, we need have no fear for the culture and humanism of our graduates. Their culture, moreover, will not be something apart from their professional interests, it will rather be identical with these interests, their very soul and essence.

The future?

What then of the future? As the medical profession becomes more fully organized, it seems to me that there will probably be much less anatomy taught in the undergraduate curriculum and much more in the postgraduate specialist courses. A reduction in the former can take place only as an increase takes place in the latter. After all, some anatomical knowledge is necessary in all branches of medicine, and very considerable anatomical knowledge is essential in some branches. Added to this is the fact that much anatomical knowledge is basic to all the other medical sciences. Anatomists cannot be dispensed with altogether. Admittedly, the knowledge which anatomists retail is old. It lacks the charm of youth and novelty and the sense of excitement which attends the prospect of discovering new facts. Nonetheless it is essential knowledge which cannot be ignored without peril to our profession. And in that wide historical view of our profession, the view from which its cultural and humanistic values spring, the place of anatomy and anatomists is both considerable and secure.

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El lugar de la Anatomía en el curriculum de la Escuela de Medicina

El Profesor C. P. Martin se ocupa en este trabajo (una conferencia de la serie que dictó recientemente en el *General Hospital* de Montreal, Canadá), del papel que la Anatomía ha desempeñado en la Ciencia Médica, desde los tiempos antiguos, y habla de los diversos estímulos que recibió el estudio de esta ciencia debido al desarrollo de otras, como la Zoología o la Antropología. Luego el autor discute la posición de dicha ciencia dentro de la Educación Médica moderna, así como los varios problemas que suscita. Entre estos problemas, uno de los más graves es la escasez de profesores de Anatomía. Las causas y efectos de esa escasez son comentados extensamente. Otro factor que afecta a la instrucción de la Anatomía en las Escuelas, es la extendida creencia de que la enseñanza de esta ciencia contiene una gran cantidad de detalles triviales, los cuales imponen al estudiante una carga desmoralizante, ya que el *curriculum* es, por otra parte, cada vez más extenso. De ahí surge una cuestión importante, la de la enseñanza de las ciencias básicas, cuyo contenido factual ha aumentado enormemente en las últimas décadas, y que se suele incluir, enteramente, en el *curriculum* de los estudiantes no graduados, mientras que muy poco esfuerzo se ha hecho para incluir éstas en los cursos de enseñanza para post-graduados. Esto es en la opinión del autor, uno de los puntos más débiles en la Educación Médica de hoy. Se sugiere que la enorme presión que sufre el estudiante no graduado a causa de un *curriculum* sobrecargado, podría ser aliviada si éste se limitase a sólo lo necesario como preparación para la práctica general, relegando a la instrucción post-graduada todo lo que de las ciencias básicas se relaciona con la especialización. Esto, desde luego, habría de traer consigo un cambio en el programa de enseñanza para post-graduados. De otro modo ninguna reducción en la instrucción de las ciencias básicas podría hacerse sin la amenaza de rebajar seriamente el nivel de la profesión médica. En cuanto al porvenir de la Anatomía dentro de las Escuelas de Medicina, el autor cree que en la medida en que se desarrolle la organización de la profesión médica, cada vez menos Anatomía será enseñada en el nivel de los pre-graduados, y cada vez más en los cursos para post-graduados.

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Separatas de este artículo, en español, podrán obtenerse si son solicitadas por un minimum de 25 lectores.

Association Headquarters Dedicated

THE Association of American Medical Colleges was host to approximately 200 guests on February 10 for the dedication ceremonies of its new headquarters building at 2530 Ridge Avenue, Evanston, Ill. Dr. John B. Youmans, president of the Association and chairman of the Executive Council, presided. The invocation was offered by The Rev. Ralph G. Dunlop, Chaplain of Northwestern University.

Speakers for the occasion included Dr. J. Roscoe Miller, President of Northwestern University, who welcomed the Association to Evanston; Dr. Joseph C. Hinsey, Director of the New York Hospital-Cornell Medical Center and Chairman of the Association's Building Committee told the story of the building; Dr. Ward Darley, Executive Director of the Association, spoke of the building as a symbol of unity among the medical schools, and in closing, Dr. Youmans formally accepted the building and expressed gratitude to the donors for their generous support in making the building possible. Benediction was given by the Rev. Mr. Dunlop. Refreshments were served after the program.

THIS BEAUTIFUL and functional building is the symbol of the unity that must exist among this nation's schools of medicine. It is also the symbol of the stability and security of the organization that is essential to this unity.

It is therefore appropriate that, as we of the Association of American Medical Colleges dedicate this building, we also rededicate ourselves to the goals set more than three-quarters of a century ago by this Association's founders i.e. the constant improvement of medical education and the continuous increase in medical knowledge. But if the dedication of this building and the rededication of ourselves are to be meaningful to our time and to time to come, we must not only keep these goals before us but also the manner of their attainment.

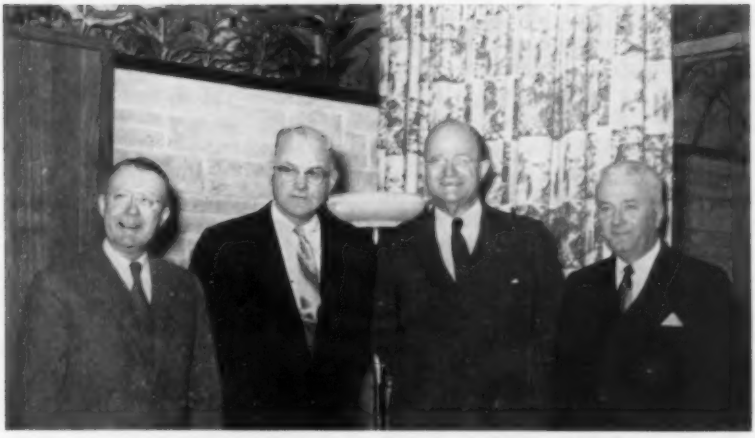
To this end we must recognize that the most enduring influence and power come from the exercise of intellectual leadership, —leadership that persuades, unifies and works steadily for progressive change through the presentation of properly gathered, properly organized and properly presented information.

In subscribing to this thesis, the many activities of the Association—the Journal; the Teaching Institutes; the school visitation program, the Medical Audio-Visual Institute; the work of the Executive Council and its many committees, and the supporting program of vigorous research—quickly take on a logical meaning because they then stand out as the instruments of discussion, synthesis and communication essential to the leadership which we profess.

This occasion, therefore, must be looked upon as a very significant milestone in the history of the Association of American Medical Colleges, for here, while we accept and dedicate a permanent home in which and from which we can carry on our work, we also rededicate ourselves to the kind of work that we know must go forward if our medical schools are to make their proper contribution to a nation that must continue healthy and strong in a world rapidly increasing in complexity and competitive effectiveness.

WARD DARLEY, M.D.

The Association of American Medical Colleges' new headquarters building at 2530 Ridge Avenue, Evanston, Ill., is pictured above. The one-story contemporary design building is occupied by the Executive Director, Dr. Ward Darley; the Secretary, Dr. Dean F. Smiley; the Journal of Medical Education; the Medical Audio-Visual Institute; and the Study Section of the Association's Committee on Educational Research and Services. The National Intern Matching Program, Inc., also has offices in the building. Holabird & Root & Burgee were the architects, and building costs were met by grants from the China Medical Board of New York, Inc. and the Alfred P. Sloan Foundation. Northwestern University donated the site for the building.



Speakers at the dedication ceremonies on February 10 included, left to right: Dr. John B. Youmans, dean of the Vanderbilt University School of Medicine and 1956-57 president of the Association; Dr. Ward Darley, the Association's Executive Director; Dr. Joseph C. Hinsey, director of the New York Hospital-Cornell Medical Center and chairman of the Association's Building Committee; and Dr. J. Roscoe Miller, president of Northwestern University.

Editorials and Comments

The Overhead Allowance on Research Grants

(A statement by the Executive Council of the Association of American Medical Colleges at a meeting February 9, 1957, upon the recommendation of the Association's Committee on Financing Medical Education)

IT IS THE conviction of the Executive Council of the Association of American Medical Colleges:

(1) That agencies, governmental or private, making research grants should cover the indirect as well as the direct costs of the research;

(2) That the current allowances for overhead almost universally fail to cover the full indirect costs of research;

(3) That because of the inadequate overhead allowances on research grants, many critical financial situations exist in our medical schools and universities.

The Executive Council therefore expresses the hope that action on this important matter, which has been so long under discussion, will be taken promptly.

Experimental Training Grants

AT THE REQUEST of the National Institutes of Health the last session of the Congress appropriated $500,000 to be awarded during the current fiscal year for a new and very interesting type of training grant.

The main purpose of these grants is to provide special training in the fundamentals of research methods to a limited number of students who are enrolled in the regular classes of our medical, dental and public health schools. Since it is assumed that increasing numbers of medical research personnel must be recruited in the future from our regular medical, dental and public health school student bodies, and since few of these students are currently getting any training in research methodology, procedure and theory comparable to the training provided most university-trained Ph.D. candidates, these grants are to be provided to meet this very specific need.

An "Experimental Training Grants Committee," with Dr. Walsh McDermott, professor of preventive medicine at Cornell University Medical College as chairman, and Dr. Edward Dempsey, professor of anatomy at Washington University School of Medicine as co-chairman, has been appointed for the purpose of reviewing proposals as submitted. The source for additional information about the grants is Dr. Ernest M. Allen, chief, Division of Research Grants, National Institutes of Health, Bethesda, Md.

It is hoped that the program may be kept very flexible and that schools interested in the possibility of participating will submit an informal outline of their proposed program and an estimate of the costs anticipated.

Many of our medical school teachers have for many years been interested in introducing their undergraduate students to investigative work. Assisting in ongoing research projects in their elective time, spending an extra year on the way through the medical course to act as an assistant in a chosen department—all these devices have been used with varying degrees of success for the purpose of interesting medical students in investigative work.

If through these new grants selected students can earn stipends in research work which will be in any way comparable with the small but essential sums earned in the customary "summer job" a great step forward will have been taken. Most students will welcome the opportunity to become familiar with some of the methods of research and will feel much happier making their necessary earnings in a field so obviously useful and so educationally rewarding. D.F.S.

Career Preferences of Medical Students in the U. S.

IN A STUDY recently completed by the National Opinion Research Center of the University of Chicago for the Research and Development Division, Office of the Surgeon General, Department of the Army, some findings of real interest to medical educators are reported.[1]

A "probability" sample of 1,114 students from 44 medical schools was made up from the Association of American Medical Colleges' file of registered students. Of these 1,114 students, 1,086 were then personally interviewed. With this high completion rate of 97.5 per cent it seems justified to place considerable reliance on the representativeness of the sample.

In answer to the question "What do you think you will like best about being a doctor?", 55 per cent checked "helping others, being of service, being useful;" 36 per cent checked "working or dealing with people;" 29 per cent checked "financial returns, security;" 27 per cent checked "prestige, social position;" 24 per cent checked "scientific interest, research interest, learning opportunity."

Replying to the question "What do you think you will like least about being a doctor?", only 40 per cent checked "interference with personal or family life," and only 33 per cent checked "long hours, late hours, night calls."

Answering the question "In your main career, would you prefer to work at medical problems that do not require frequent contacts with patients; or to work directly with patients almost all the time?", about 9 out of 10 chose "work directly with patients almost all the time."

"Having the opportunity to know your patients well" was rated by more students as "very important" in deciding on one's medical career than any one of six other considerations.

Forty-one per cent stated they would be "very interested" in spending at least part of their time in medical teaching after having completed their training, while only 21 per cent showed such interest in "medical research" and only five per cent showed such interest in "medical administration such as running a hospital."

Eighty-seven per cent would prefer a career in some non-salaried type of practice (26 per cent preferring "individual practice," 31 per cent "individual practice with pooled facilities," and 30 per cent "group practice in a partnership arrangement." Only one per cent preferred "medical officer in one of the Armed Forces," and only three per cent chose other types of salaried careers.

It is interesting that while 33 per cent of freshmen chose "individual practice," only 22 per cent of seniors expressed that preference. While 39 per cent of seniors chose "group practice in a partnership arrangement," only 22 per cent of freshmen expressed that preference.

Answering the question "After your internship (and a possible two years in the Armed Forces) which are you most likely to do—to have a general practice, or to specialize to some extent, or to take a residency in some specialty?"; 25 per cent checked "general practice;" 14 per cent checked "specialize to some extent;" 57 per cent checked "take a residency."

Replying to the question, "If you were to specialize in your practice what field of specialization do you think you would prefer most?", 30 per cent checked internal medicine; 22 per cent checked surgery; 10 per cent checked pediatrics; 10 per cent checked obstetrics and gynecology; 8 per cent checked psychiatry and/or neurology.

The average net income expected by these 1,086 students 10 years after graduation was something in excess of $14,000. "At the height of their careers, they hope for an average net income in excess of $22,000."

This report documents a study well-planned and well-executed. It is deserving of careful study by all medical educators. D.F.S.

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NEWS DIGEST

Fifty-third Congress on Medical Education and Licensure

The 53rd Annual Congress on Medical Education and Licensure was held on February 9-12 at the Palmer House, Chicago, Ill. Sponsors of the Congress were the Council on Medical Education and Hospitals of the American Medical Association, the Advisory Board for Medical Specialties, and the Federation of State Medical Boards of the United States.

On Sunday, February 10, the morning session was devoted to a conference on "Graduate Education for General Practice—1957," co-sponsored by the Council on Medical Education and Hospitals of the American Medical Association and the Advisory Board for Medical Specialties. Speakers included Dr. E. Hugh Luckey, dean of Cornell University Medical College; Dr. William B. Hildebrand, former president of the American Academy of General Practice; Dr. William B. Bean, professor of medicine, State University of Iowa College of Medicine; Dr. Charles B. Puestow, clinical professor of surgery, University of Illinois College of Medicine; Dr. Philip S. Barba, associate professor of pediatrics, School of Medicine and Graduate School of Medicine, University of Pennsylvania; Dr. Lawrence M. Randall, professor of obstetrics and gynecology, Mayo Foundation Graduate School of Medicine, University of Minnesota; and Dr. M. Ralph Kaufman, clinical professor of psychiatry, Columbia University College of Physicians and Surgeons. The afternoon session was devoted to business matters.

On February 11 the morning session covered the topic, "Medical Education Tomorrow." Speakers were Dr. H. G. Weiskotten, chairman of the Council on Medical Education and Hospitals of the American Medical Association; Dr. John C. Whitehorn, director, department of psychiatry, Johns Hopkins University School of Medicine; Dr. Dana W. Atchley, professor of clinical medicine, Columbia University College of Physicians and Surgeons; Dr. Edward W. Dempsey, professor of anatomy, Washington University School of Medicine; Dr. Oliver Cope, associate professor of surgery, Harvard Medical School, and Dr. W. Barry Wood Jr., vice president, the Johns Hopkins Medical Institutions.

This conference, sponsored by the Council of Medical Education and Hospitals of the American Medical Association, devoted its afternoon session to "Postgraduate Medical Education." Presiding was Dr. Victor Johnson, director of the Mayo Foundation for Medical Education and Research, and member of the Council on Medical Education and Hospitals. Speakers included Dr. William A. Sodeman, professor of medicine and chairman of the department, University of Missouri School of Medicine; Dr. Glen R. Shepherd, assistant secretary, Council on Medical Education and Hospitals; Dr. Mahlon H. Delp, professor of medicine and assistant dean, University of Kansas School of Medicine; Dr. Harry A. Towsley, professor of pediatrics and coordinator Affiliated Hospital Activities in Postgraduate Medical Education, University of Michigan Medical School; Dr. Charles F. Wilkinson Jr., professor and chairman of the department of medicine, New York University Postgraduate Medical School, and Dr. Edmund Pellegrino, medical director of the Hunterdon Medical Center.

The conference on Tuesday, February 12, sponsored by the Federation of State Medical Boards of the United States, had as its speakers

Dr. Joseph J. Combs, president of the Federation; Dr. Willard C. Rappleye, dean, Columbia University College of Physicians and Surgeons; Dr. John L. Caughey Jr., associate dean, Western Reserve University College of Medicine, and Dr. S. M. Poindexter, chairman, Idaho State Board of Medical Examiners.

The meeting concluded with reports of committees and new and unfinished business.

Dr. Darley Resigns Chairmanship

Dr. WARD DARLEY, who has assumed his duties as Executive Director of the Association, resigned as chairman of the Western Interstate Commission for Higher Education, effective February 1.

Public Health Service Grant

The Public Health Service, according to a recent issue of *Scope Weekly* has awarded a grant of $575,000 to Alan E. Treloar, Ph.D., research director of the American Hospital Association. Dr. Treloar's grant is for the evaluation of the effectiveness of drugs in treating heart disease and is the largest research grant of its kind ever made by the National Heart Institute. Dr. Treloar, currently on leave from his post at the University of Minnesota Medical School, where he is professor of biostatistics in the School of Public Health, will direct a nationwide program that will coordinate the activities of a number of research teams in medical schools and hospitals.

The primary purpose of the investigation is to evaluate the effectiveness of drugs released for therapeutic use in the management of cardiovascular diseases, particularly hypertension. A second objective is to develop an improved method of cooperative investigation in the general field of drug evaluation.

Tobacco Research Funds

New appropriations of $700,000 for research into tobacco use and health have been provided by the Tobacco Industry Research Committee, bringing the total to $2,200,000 since its start in 1954. More than 60 independent scientists working in hospitals and research institutions throughout the country are now carrying forward their medical research with the Committees' support.

Funds Required

According to the publication *Higher Education in the West*, legislators in eight western states and the territory of Alaska will be asked to appropriate nearly $500,000 in 1957 to finance their state's participation in the student exchange program of the Western Interstate Commission for Higher Education.

The money will be requested in order to send 280 students across state boundaries to study medicine, dentistry and veterinary medicine in the professional schools of other states. The sending states and territory save the cost of building and maintaining their own professional schools in all three fields by buying space for their students in the schools of other states.

Easter Seal Foundation Grants

Three long-range research projects in rehabilitation will receive grants totaling $51,300 from the Easter Seal Research Foundation. Two of the projects will seek to improve effectiveness of bone grafts in orthopedic surgery. The third will attempt to determine physiological causes of stuttering.

Dr. William T. Sanger, chancellor of the Medical College of Virginia and chairman of the Foundation's board of trustees, announced the awarding of funds to investigators at Western Reserve University School of Medicine, the University of Mississippi Medical Center, and the State University of Iowa.

Wegman Appointed

Dr. Myron E. Wegman has been appointed Secretary General of the Pan American Sanitary Bureau, Regional Office of the World Health Organization. Dr. Wegman will be the Bureau's chief planning officer,

responsible for coordinating the program planning of the organization in the light of the health needs of the member countries. Since 1952, Dr. Wegman has been chief of the Bureau's Division of Education and Training, working with medical schools, public health schools and other educational institutions, which has brought him into close association with all the governments and public health administrations in the Americas. He has recently conducted seminars on preventive medicine in which all medical schools in Latin America participated and is now completing a comprehensive survey of pediatric education throughout the Continent.

New Director

Dr. Eugene B. Ferris, formerly professor of medicine and chairman of the department of medicine, Emory University School of Medicine, has been appointed medical director of the American Heart Association. In his new position, Dr. Ferris will plan and direct the medical and scientific programs of the Association.

Postgraduate Education in Preventive Medicine and Public Health

In response to an increasing demand for training designed to prepare candidates to teach preventive medicine, the Harvard School of Public Health has organized a special interdepartmental and interuniversity program. The students who are admitted to this program must have had sufficient training in clinical medicine to enable them to deal authoritatively with certain diseases or specific fields. The curriculum consists of courses in ecology, biostatistics, epidemiology, communicable diseases, sanitary engineering, and many electives in various fields.

In the preventive medicine residency program the resources and staff of departments in the following medical schools will be available in the initial phases of the program: Western Reserve University, Vanderbilt University, University of Pennsylvania, Boston University, State University of New York and McGill University.

This course is available to candidates for the following degrees, depending on previous background and training: Master of Public Health, Master of Science in Hygiene, Doctor of Public Health, and Doctor of Science in Hygiene.

The admission requirements for each degree are outlined in the Official Register of the school, which may be obtained by writing to the Secretary, Harvard School of Public Health, 55 Shattuck Street, Boston 15, Mass.

Hemo The Magnificent Appears on TV

The circulation of the blood is the subject of "Hemo the Magnificent," the second program in the Bell System Science Series, which will be telecast in color over the CBS network on Wednesday, March 20, at 9 p.m., EST.

One section of the film shows the actual flow of blood through the arteries, capillaries, and veins in motion pictures taken through a powerful microscope. Another sequence, in slow motion, shows the beating of a human heart. The circulatory system is explained in a simple way by animation sequences.

Special advisors on "Hemo the Magnificent" included Dr. Maurice B. Visscher, University of Minnesota; Dr. Chauncey D. Leake, Ohio State University; Dr. Gordon K. Moe, State University of New York; and Dr. Allan Hemingway, University of California at Los Angeles.

College Briefs

Albany

Two grants totaling $52,782 have been received from the National Cancer Institute of the Public Health Service. These awards will be administered by the department of medicine. The first, for $50,827, will be used for a five-year study of the effects of pressure and temperature on cancer cells growing in tissue culture. Principal investigator will be Dr. JOSEPH P. LANDAU, research associate. He will work in conjunction with Dr. KENNETH B. OLSON, Dr. CHARLES A. HALL and Dr. CHARLES HURWITZ. The second award of $1,955 will be used to study the efficacy of transplating human tumors in animals and Dr. JOHN V. SKIFF Jr., research fellow in medicine, will conduct the studies. Dr. Skiff will work under the direction of Dr. Olson and Dr. ARTHUR A. STEIN.

Baylor

Research grants totaling $760,523.65 were received during the first six months of the 1956-57 fiscal year. This sum already exceeds the total amount of $720,775.90 received during the entire previous fiscal year July 1955 to July 1956.

An eight-week graduate course emphasizing cardiovascular physiology will be offered for the first time this summer. Limited fellowships are available. The course will incorporate the use of the physiograph, a new electronic multi-channel physiological recorder, the latest aids to teaching such as closed circuit television, and a newly designed air-conditioned laboratory providing accommodation for 80 students.

Chicago University

Dr. LLOYD J. ROTH has been named chairman of the department of pharmacology, succeeding Dr. EUGENE M. K. GEILING, who is retiring after 20 years as head of the department. Dr. Geiling has been the Frank P. Hixon Distinguished Service Professor since 1941, and professor and chairman of pharmacology since 1936.

Columbia

A project to develop an artificial respirator automatically controlled by the concentration of carbon dioxide its user inhales, will be continued under the direction of Dr. M. JACK FRUMIN, assistant professor of anesthesiology, by a grant of $9,943 from the National Foundation for Infantile Paralysis. The device, by measuring the carbon dioxide expired by a patient under anesthesia, regulates the pressure at which the inhaled gases are delivered to the patient by the respirator.

Duke

The second of four Heart Disease Institutes for Tar Heel public welfare and vocational rehabilitation workers was held at Duke on February 12-15. Conducted under provisions of a $10,000 grant made to Duke Hospital's Social Service Division by the National Heart Institute of the Department of Health, Education and Welfare, the institutes were designed to give participants a better acquaintance with new trends in the treatment and rehabilitation of heart disease patients. This grant is the first in the United States given by the Natonal Heart Institute for training social workers.

Albert Einstein

A gift of $500,000 has been received for the construction of an auditorium, with facilities for closed-circuit television and three-dimensional film projection. This auditorium, to be known as the Mary and Karl Robbins Auditorium, will be located on the school's 16-acre site at Morris Park Avenue and Eastchester Road, the Bronx. It is sched-

uled to be completed before the opening of the college's third academic year this September. The Robbins Foundation Inc. contribution is part of the university's $25 million development fund program, now in its second year. The auditorium, with a capacity of 838 seats, will be equipped with facilities for audio-visual teaching and intercommunication.

Emory

Dr. GEOFFREY H. BOURNE has been named chairman of the anatomy department and will assume his duties in July. Dr. Bourne is presently a reader in histology at the London Hospital Medical College, and is secretary of the British Society for Research on Ageing and secretary of the British Nutrition Society.

Harvard

A grant of $48,000 for a three-year program devoted to the strengthening of teaching and research in the field of carbohydrate metabolism and diabetes, has been made to the medical school by the Adler Foundation, Inc. The program will be directed by Dr. ALBERT RENOLD, associate in medicine and director of the laboratory and metabolism ward of the department of medicine, Peter Bent Brigham Hospital.

Michigan

Dr. G. ROBERT GREENBERG has recently been appointed professor of biological chemistry. Dr. Greenberg has been associate professor of biochemistry at Western Reserve University and during the past year, senior National Science fellow, working at Kings College, England.

Minnesota

Dr. H. MEAD CAVERT has been appointed assistant dean, succeeding Dr. WILLIAM F. MALONEY, who resigned to become dean of the Medical College of Virginia. Dr. Cavert will continue his teaching and research activities on a part-time basis, and will share assistant dean's duties with Dr. N. L. GAULT Jr., who has served in that capacity for the past year.

Dr. JOHN H. MOE has been named professor and director of the division of orthopedic surgery, succeeding Dr. LEONARD F. PELTIER, who has left the university to head the section of orthopedic surgery at the University of Kansas Medical School.

Dr. JOHN J. BITTNER and Dr. CARLOS MARTINEZ of the division of cancer biology, department of physiology, have been invited to present papers before an International Symposium on Mammary Cancer sponsored by the division of cancer research, University of Perugia, Italy. Approximately 60 investigators from 11 countries will attend the symposium which will be held July 24-29. Dr. Martinez will remain in Italy for 10 weeks to give lectures and demonstrations of research techniques for the staff of the Instituto di Anatomia e Istologia Patologica, University of Perugia. Before returning, he will also lecture at the University of Madrid, Spain.

Mayo Foundation

An exchange fellowship, sponsored jointly by the American Orthopaedic Association and the British Orthopaedic Association, has been awarded to Dr. EDWIN D. HENDERSON, instructor in orthopedic surgery. Dr. Henderson is one of four American and one Canadian orthopedic surgeons to be thus honored this year. The five exchange fellows will go to the British Isles around the middle of April and will spend seven weeks in touring orthopedic centers in London, Oxford, Cambridge, Edinburgh, Glasgow, and other cities.

Missouri

Dr. HUGH E. STEPHENSON Jr., associate professor and chairman of the department of surgery, was named as one of the 10 outstanding men of the nation for 1956 by the United States Junior Chamber of Com-

merce. Dr. Stephenson was named for this award on the basis of his part in establishing the first course to acquaint doctors with problems of practical cardiac resuscitation and for his role in the development of the four-year medical school at the university.

A grant in the amount of $4,140 has been awarded to Dr. A. W. MERRICK, assistant professor in the department of physiology and pharmacology, by the Department of Health, Education and Welfare. This award will be used for an in vitro study of the effects of primary cations upon mammalian cardiac glycogen fractions.

N. Y. Med. Coll.

Dr. JOSEPH L. MORSE has been appointed director of the department of dermatology and professor in the department. Dr. Morse has been a member of the faculty at New York Postgraduate Medical School, New York University, Bellevue-Medical Center, for 30 years and associate clinical professor of dermatology there since 1950. He has also been appointed attending dermatologist to Flower-Fifth Avenue, Metropolitan, and Coler hospitals, affiliates of the medical college.

Oregon

Dr. CHARLES N. HOLMAN has been appointed associate dean and will also continue to serve as medical director and administrator of the school's hospitals and clinics and as administrator of the medical school hospital. Dr. Holman is the first associate dean to be appointed at the institution since Dr. Baird assumed that title in 1937.

The following appointments were made to the full-time teaching staff: Dr. GEORGE M. AUSTIN will become the first full-time head of the division of neurosurgery, effective July 1, succeeding Dr. JOHN RAAF, who has been advanced to clinical professor of surgery and senior consultant in neurosurgery; Dr. JACK COLEMAN EDWARDS, recently returned from army service, will become assistant professor of surgery in anesthesiology; Dr. EUGENE W. LANDRETH, who has most recently been a pathologist for the navy, will be assistant professor of clinical pathology.

Gifts and grants totaling $222,234 have been received since the end of November. Of that amount, $203,161 came from the Public Health Service. Largest single grant went to Dr. E. E. OSGOOD, professor and head of the division of experimental medicine, for his research project, "Tissue Culture, Hemolysis and Metabolism in Leukemia."

Pennsylvania

The W. K. Kellogg Foundation of Battle Creek, Mich., has made a five-year commitment of $401,515 to the medical school for the testing and improving of the periodic health examination as an instrument for the early detection of disease and the promotion of health. The project will be carried by the department of preventive medicine and public health, of which Dr. JOHN P. HUBBARD is chairman. The project is based on the belief that the merits and limitations of the periodic medical examination for presumably well persons should be reappraised and components for a new examination developed that may be used in population groups of varying size and financial status.

State U. of N. Y.—Syracuse

Dr. MARC H. HOLLENDER, professor and chairman of the department of psychiatry, has been appointed director of Syracuse Psychopathic Hospital. Dr. Hollender's new position will be in addition to his present duties at the College of Medicine.

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Audiovisual News

Summaries of Film Reviews

An Aid to Therapy: Bacterial Antibiotic Susceptibility Testing

26 min., sd., color 16 mm., 1957.

After somewhat long explanatory titles a doctor examines a patient with sore throat. A neck carbuncle is incised and drained and a specimen taken, while the need for antibiotic susceptibility testing is stated. In the laboratory, plating of organisms directly from a swab or from subculture, permits antibiotic susceptibility testing with impregnated disks, and also with agar well and cup methods. A dye demonstration illustrates the principle of diffusion in agar, and the basis for possible misinterpretations. To narrow somewhat the choice of antibiotics, disk testing is shown with different concentrations of antibiotics. The broth dilution method using standardized numbers of organisms introduced into test antibiotic solutions in serial dilution provides an end point which is the "minimal inhibiting concentration." The method is indicated for the determination of antibiotic synergism, antagonism, additive and indifferent effects. The clinical importance of testing is suggested.

This film on an important laboratory determination fulfills criteria for clarity and selectivity. The methods shown are those commonly employed and available in most clinical laboratories; and the ingenious dye demonstration aids interpretation of the disk technique. The sponsor's antibiotics are deftly minimized. Production is skillful and direct in visualizations.

For training of laboratory personnel and for informing clinicians, the film can serve either as an introduction or a summary of currently acceptable practices. Expert discussion can broaden what is necessarily a brief condensate of a frequently difficult laboratory problem. Supplemental notes are available and helpful. D.S.R. with KUMC Panel, January 1957.

Audience: Laboratory technicians, medical students, doctors.

Production Data: Sponsor: Pfizer Laboratories, Brooklyn, New York; **Authors:** Leo L. Leveridge, M.D., Frederick C. Fink, Ph.D., Pfizer Laboratories; **Consultants:** Gerard von Halsema, Ph.D., Peter Dineen, M.D., Aaron Prigot, M.D., Earle H. Spaulding, Ph.D., Theodore G. Anderson, Ph.D., and Gladys Hobby, Ph.D.; **Producer: Campus Film Productions, Inc.,** New York.

Distribution: Pfizer Laboratories, Div., Chas. Pfizer & Co., Inc., 630 Flushing Avenue, Brooklyn 6, N.Y.

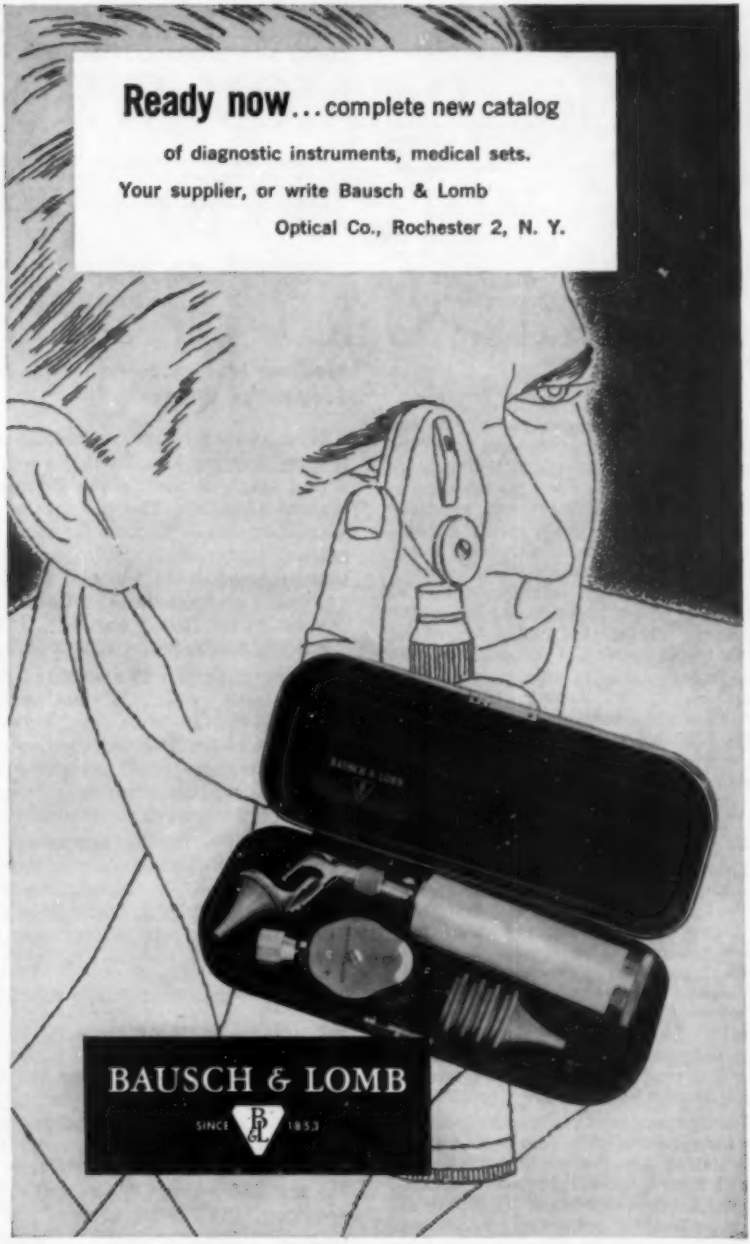
Functions of the Normal Larynx

22 min., sd., color, 16 mm., 1956.

The anatomy of the larynx and the movements of the vocal cords are introduced with models. The authors' equipment for high speed cinematography, utilizing the laryngeal mirror, is explained. The potential results of such a study method are generalized. The vocal cords are filmed in extreme slow motion during a variety of phonational actions, including the delivery of a musical scale and a violent cough.

Unfortunately for the film's impact, it is somewhat schizophrenic in character. On the one hand it shows arresting, if inadequately analytical, scientific high speed cinematography of a poorly understood phenomenon; on the other it expresses lay sentimentality and blithe salesmanship for a "new" method and its potentialities. The slow motion film data is revealing, fascinating and perhaps of medical importance; the advent of color certainly has value; film learning is lessened by the unnecessary and uncorrelated noise of the high speed camera, the exposition of the camera-light complex, and the overdramatized beginning and end. Excellent film material is incompletely realized through questionable film judgment.

The film should be of contemporary interest to students of speech, laryngology, physiology, and cinematography. The method of filming in color, and interpretations of what is revealed will be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of value to investigators. GVW and DSR with KUMC Panel, 1957.

Audience: Students of ENT and Speech.

Production Data: Sponsor: William and Harriet Gould Foundation. **Authors:** Paul Moore, Ph.D., Hans von Leden, M.D., Evelyn Robe, Ph.D., Voice Research Laboratory, Northwestern University; **Photography:** Paul C. Jorgensen; **Film Consultant:** Mervin W. LaRue, Sr.

Distribution: Hans von Leden, M.D., 30 N. Michigan Avenue, Chicago 2, Ill. **Rental:** $5; **Sale:** $140.; Medical Audio-Visual Institute of the Association of American Medical Colleges, 2530 Ridge Avenue, Evanston, Ill., **Rental:** $7.

Frenquel, a New Blocking Agent Against LSD-25 Psychosis

32 min., sd., color, 16 mm., 1955.

Two volunteer students of psychology experience LSD-25 psychoses. One subject is seen at intervals for 9 hours, while Dr. Fabing seeks to elicit verbal expressions of the subject's internal reactions of nervousness, apprehension, depression, withdrawal and confusion, a paranoid and almost catatonic state. Twenty-four hours later the volunteer describes his progressive feelings. After taking Frenquel (MER-17) daily for seven days, the same volunteers take LSD-25 once more; there is depression but no hallucination. Dr. Fabing discusses the clinical implications. One volunteer then takes LSD-25, and becomes almost catatonic in his withdrawal at 4 hours. Intravenous Frenquel terminates the state of confusion in 5 minutes, and the youth is "back to normal perspective" in an hour.

This rather frightening film of LSD-25-induced psychoses in a young man, with the experimental counter-effects of a new anti-hallucinatory agent, provides both a graphic report of the important new experimental model psychosis and also preliminary observations of a new drug agent against such "psychoses." The material is very provocative and contemporarily of high interest. The film production is adequate without being imaginative or very proficient.

For discussions of model psychoses and blocking agents this film will provide stimulating fare to medical audiences. Supplemental notes provide additional data. Adequate discussion by a psychiatrist, neurologist or other experts will be very helpful to any audience relatively unfamiliar with the experimental approaches shown.

Reference: Fabing, H. D., Frenquel, A Blocking Agent Against Experimental LSD-25 and Mescaline Psychosis. Neurology and Psychology, 5:319, May 1955.

Audience: Physicians, medical and psychology students.

Production Data: Sponsor: Wm. S. Merrill Co., Cincinnati, Ohio; **Author-Narrator:** Howard D. Fabing, Christ Hospital, Cincinnati; **Producer:** Brand Studios, Cincinnati.

Distribution: Wm. S. Merrell Company, Professional Relations Department, Cincinnati 15, Ohio.

Medical Motion Picture Production Workshop

Approximately 150 people attended a three day workshop held in a large sound stage of the Calvin Company, Kansas City, Mo. The purpose of the workshop was—"to consider basic and factual material in 16 mm. motion picture production for the fields of of health and medicine, through the utilization of (film) exhibits, (film) demonstrations, and discussions."

The workshop was sponsored on a tuition basis by the Calvin Company working closely with the Veterans Administration. The faculty included Calvin Company staff members and other film producers nationally recognized for their work in medical films.

Participants in the workshop included 85 Veterans Administration photographers. The remainder were clinical photographers and film producers from schools of medicine and dentistry.

TV Workshop Held

On February 7, following the film workshop, the Kansas University Medical Center held a medical television workshop. The demonstrations and discussions included "Color TV for the Laboratory," "Color TV Microscopy," "TV Fluoroscopy," "Psychiatric Interviewing," "Surgical Teaching" and "Scrambled Image Television."

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Book Reviews

Handbook of Pediatric Medical Emergencies

Adolph G. DeSanctis and **Charles Varga.** C. V. Mosby Co., 1956. 389 pp.

The second edition of this popular book contains considerable new material as well as a revision of much of the old material. In the new chapter on Metabolic Emergencies, for example, one can find sufficiently detailed instructions for estimating and restoring disturbed fluid and electrolyte balance to make the rapid handling of these dangerous situations relatively easy for those physicians who are not already thoroughly conversant with them.

The chapter on Respiratory Emergencies is also excellent. But one cannot help wondering if the term "croup" is not used by most people to designate that relatively common and relatively innocuous "laryngeal spasm" rather than those devastatingly acute obstructions described under the term laryngotracheobronchitis. However this is obviously a minor point and does not detract from the value of the discussions as given.

The book also contains a very comprehensive list of household materials together with their toxic ingredients and cross references to the sections describing treatment. This will frequently be a time saver in handling cases of poisoning in children which is unfortunately still a very common occurrence.

The section on procedures contains some valuable diagrams and photographs, but a few of them fail to give more than a general impression of the procedure being carried out.

H. Kent Tenney, *Wisconsin*

Modern Nutrition in Health and Disease

Edited by **Wohl** and **Goodhart.** Lea & Febiger, Philadelphia, 1955. 1062 pp. with index.

This book has much to recommend it. Gathered together in one reasonably sized volume are contributions by some outstanding investigators in the modern field of nutrition. Nearly one half of the book is devoted to normal nutrition, and presents the more fundamental aspects of biochemical and physiological considerations of carbohydrate, protein and fat metabolism. The vitamins are dealt with *in extenso* and many adequate references are presented for each section. The book contains numerous tables providing information on the vitamin and mineral content of foods, thus making it a useful source of information for the physician. The clinical syndromes of the individual vitamin deficiencies are well outlined and correlated with the laboratory findings.

The second half of the book deals primarily with nutrition and disease and the editors apparently felt it necessary to include some nutritional information for each clinical specialty. Unfortunately some of these sections are less strong than others, but do not detract from the value of the book. A wealth of detail is available on a wide variety of clinical conditions requiring dietary management. Teachers of medicine will be wise to recommend it to their students.

Harry A. Waisman, *Wisconsin.*

William's Obstetrics

Nicholson J. Eastman, M.D., Eleventh Edition, 1212 pp. with illustrations, Appleton Century-Crafts, Inc., New York, 1956.

Eastman is right in stating that obstetrics marches on. This 11th edition of WILLIAM'S OBSTETRICS, which is well known all over the world shows that clearly. The many well-written new chapters show the multiple new achievements in obstetrics: the handling of obstetrical shock, afibrinogenemia, the use of hypertensive drugs, the new experiences with placental hormones, the studies on uterine and placental blood flow, the problem of retrolental fibroplasia and many more. There is hardly any problem in obstetrics for which this book may not be used as a basic source of knowledge, or leading point for further studies. Bibliography is ample and well-divided.

An excellent chapter by Kanner deals with the psychiatric aspects of pregnancy and childbirth. This part may be especially helpful to the young obstetrician who is faced in his practice with many forms of worries and fears connected with gestation.

Herbut—Pathology

By PETER A. HERBUT, M.D.

Professor of Pathology, Jefferson Medical College and Director of Clinical Laboratories, Jefferson Medical College Hospital, Philadelphia, Pa.

Important pathologic changes encountered in the daily practice of medicine are presented clearly and concisely in this well-organized work. In preparing the text for undergraduate medical students, Dr. Herbut has been aware of the need for a logically presented, well-illustrated factual work, with ample correlated clinical material. In being complete without unessential details, the book more than meets these requirements. It is based upon the author's didactic pathologic lectures given at Jefferson Medical College, and defines the subject in accordance with the five major categories of disease.

1227 Pages, 7" x 10". 1378 Illustrations on 651 Figures and 6 Plates in Color. $16.00

Starling—Human Physiology

Edited and Revised by SIR CHARLES LOVATT EVANS

D.Sc., F.R.C.P., F.R.S., LL.D., Birmingham

Emeritus Professor of Physiology, University of London

This is a classic work in the principles of human physiology. The subject is presented from the scientific, rather than from the clinical point of view, although there are discussions of clinical matters which should prove to be of interest to students. Dr. Evans has done his usual fine job of revising the textmatter and has brought it fully up to date. The book has been enlarged and 41 new illustrations have been added. Many older illustrations have been deleted. Several new and helpful formula boxes have been added to those that already supplement the text. Professor Hartridge has again revised the chapters on the special senses.

New 12th Edition. 1233 Pages. 721 Illustrations, Some in Color. $12.50

Burch and Winsor—A Primer Of Electrocardiography

By GEORGE E. BURCH, M.D., F.A.C.P.

Henderson Professor of Medicine, Tulane University School of Medicine

and TRAVIS WINSOR, M.D., F.A.C.P.

Assistant Clinical Professor of Medicine, University of Southern California Medical School

With this authoritative book, students unfamiliar with the subject can acquire a fundamental knowledge of electrocardiography in the most direct manner. The mechanistic point of view is used throughout. The 3rd edition is fully up to date in accordance with today's accepted concepts. "Should be included among the valuable texts on electrocardiography"—*Annals of Internal Medicine.*

3rd Edition. 286 Pages. 281 Illustrations. $5.00

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Some changes in terminology as "antepartal care," "transverse lie," and "shoulder presentation" can be easily accepted.

There is no doubt that this valuable basic book shall continue to be studied throughout the world.

Frederick M. Zerzavy, *Maryland.*

Clinical Urology

Oswald Swinney Lowsley, and **Thomas Joseph Kirwin.** The Williams & Wilkins Company, Baltimore, 1956, 958 pp.

The third edition of Lowsley and Kirwin's urology is a complete revision of the previous two editions, the first of which appeared in 1940. The many advances in the field of urology in the past fifteen years are reflected in this excellent work totalling 985 pages. The format has been changed with enlargement of the pages which are arranged into three columns for better readability. The 599 illustrations by William Didusch are superb. Standard operative procedures are beautifully and clearly shown in successive steps.

Too many of the recent textbooks in this field fail to present an adequate and well chosen bibliography. Significant contributions, especially of older date and of foreign origin, are often ignored. The authors of this work have not fallen into this error, for their list of references reveals a thorough knowledge of and a careful selection of the world literature.

The text is clearly and simply presented and should be of interest to the medical student as well as to urologists and general surgeons.

Frederick A. Lloyd, *Northwestern.*

Diabetes Mellitus

Howard F. Root and **Priscilla White.** Landsburger Medical Books, Inc., New York. 1956.

The authors have succeeded admirably in providing all of the information necessary for the care of diabetics in a handy booklet of 346 pages. Although intended primarily for the day to day use for the physician in practice and devoted mostly to the management of diabetes and its complications, a great deal of fundamental material concerning the pathophysiology and heredity of diabetes is included. In fact, there is so much of this that one wonders whether a more critical limitation of this fundamental material might not have made the volume more useful to the practicing physician. An excellent feature of the book is the frequent inclusion of summarizing outlines in the text which add greatly to the clarity and conciseness. The material is very much up to date including the usage of the latest diagnostic tapes for determining urine glucose and oral hypoglycemic agents. A useful outline of the examination of the diabetic patient is followed by a practical chapter on diets. Three chapters on various aspects of insulin therapy are most complete. A chapter on the management of coma, based as it is on the vast experience of the authors, is most helpful. A brief but effective chapter on tuberculosis in diabetes focuses on this disease as the third and fourth most common cause of death in diabetics of the younger and older age group respectively. In the chapter on urinary tract infections the dreaded necrotizing papillitis is mentioned without, however, pointing to the usefulness of the urogram as a diagnostic aid. Chapters on skin complications, diabetic nephropathy and eye disease cover a great deal of clinical ground in concise form. In the management of cardiovascular disease, there are a number of points which might not be accepted by all, such as: complete bed rest after coronaries and suggested maintenance of prothrombin time between 8 and 15 per cent of normal. In the chapter on diabetic nephropathy, the suggestion of adrenal failure with advancing lesions is indicated by a fall in the excretion of 17-keto and 17-hydroxycoricoids. This is probably not correct since it is the poor clearance of these steroids which accounts for the low urine titers. In the chapter on the management of diabetes with surgical complications a most useful and detailed set of rules for foot care are presented. The chapter on diabetes in pregnancy is excellent and most complete though somewhat too detailed for this type of book. The lack of progesterone and estrogen is emphasized as a cause of high fetal mortality in those not treated by replacement therapy. Unfortunately, the exact dosage of stilbesterol and progesterone cannot be derived from the available text. The chapter on juvenile diabetes abounds with sound advice and the table on genetic predictability of the disease should be most helpful to the practitioner in his genetic advice to a diabetic family.

One might question the need for including the chapter on the children born to diabetic mothers inasmuch as this represents a most specialized field.

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Whereas the examination of urine and blood with a discussion of the useful methods is most welcome, it is debatable whether the section on the determination of pregnandiol, 17-ketosteroids and 17-hydroxysteroids, being of necessity somewhat incomplete, really belongs into a handbook for the practicing physician.

Apart from a number of misprints, and the absence of a bibliography, which would have been useful because of the frequent references to basic material throughout the text. this handbook on diabetes mellitus represents a most valuable guide to its management and affords at the same time a thorough, concise, though somewhat uncritical summary of the basic aspects of this protean metabolic disease. It should be on the desk of practitioners as well as every medical student.

Peter H. Forsham, *California, S. F.*

Oral Cancer and Tumors of the Jaws

George S. Sharp, M.D., Weldon K. Bullock, M.D.; John W. Haslet, D.D.S. The Blakiston Division, McGraw-Hill Book Co., Inc. 1956. 561 pages—Price $15.

A keen interest in the diagnosis and treatment of tumors, benign and malignant, of the head and neck has been developing in the past decade. During the last six or seven years much literature on this subject or its numerous subdivisions has appeared including several books treating various phases of this multifacetted problem. It is fitting then to have this new book on Oral Cancer and Tumors of the Jaws.

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In utero, the oxygen environment is comparable to an altitude of 33,000 ft.[1] But the fetus needs no oxygen mask. Thanks to the placenta, the unborn is well equipped for high altitude. However, a premature descent from this "Mt. Everest *in utero*"[1] plunges the infant into an environment for which he is *not* prepared.

Premature birth is associated with the majority of fetal deaths and two-thirds of early neonatal deaths.[2] In addition, it is a significant etiologic factor in disorders ranging from behavior problems to cerebral palsy.[3]

With the help of Releasin, premature labor may often be controlled.[4, 5] A new hormone of pregnancy, Releasin is indicated when labor occurs between the 29th and 36th week of pregnancy. Its use has been demonstrated to increase the chance of delivering a viable infant:

- Releasin may halt premature labor entirely in many cases.
- In others, birth is often delayed long enough to permit additional days or weeks of intrauterine life, greatly increasing the child's chance of survival.

Complete literature is available on request.

References: **1.** Eastman, N. J.: Am. J. Obst. & Gynec. *67*:701 (April) 1954. **2.** A New Focus: Perinatal Mortality, New York: Metropolitan Life Insurance Co. **3.** Pasamanick, B., and Kawi, A.: J. Pediat. *48*:596 (May) 1956. **4.** Abramson, D., and Reid, D. E.: J. Clin. Endocrinol. & Metab. *15*:206 (Jan.) 1955. **5.** Eichner, E.; Waltner, C.; Goodman, M., and Post, S.: Am. J. Obst. & Gynec. *71*:1035 (May) 1956.

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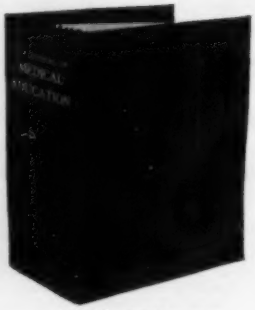

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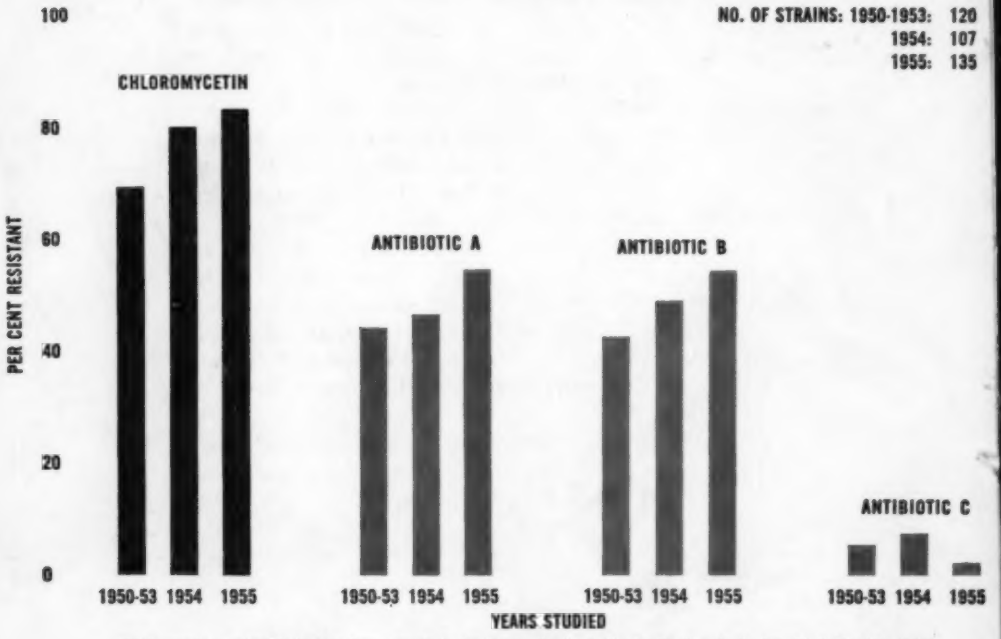

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